



UNION OF SOUTH AFRICA



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OF THE

Department of Public Health

YEAR ENDED 30th JUNE, 1939

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DEPARTMENT OF PUBLIC HEALTH.

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DEPARTMENT OF PUBLIC HEALTH.



Report for the Year ended 30th June, 1939.

THE HONOURABLE THE MINISTER OF PUBLIC HEALTH.
PRETORIA.

I have the honour to submit the Report of the Department of Public Health for the year ended 30th June, 1939.

The report is presented in two parts. In Part I an account is given of the health of the Union. In Part II the health administrative machinery of the Union is described.

E. H. CLUVER,
Secretary for Public Health.

Pretoria, 18th December, 1939.

PART I.

THE HEALTH OF THE UNION.

I.—GENERAL INDICES OF HEALTH.

1.—VITAL STATISTICS.

The total population of the Union at 30th June, 1938, as estimated by the Director of Census and Statistics, was 9,979,900, consisting of 2,081,400 Europeans and 7,898,500 non-Europeans. The non-European population is to be further divided into 6,870,900 Bantu, 227,600 Asiatic and 800,000 Mixed or other Coloured.

The Report on the Vital Statistics of the Union of South Africa, 1937, appeared shortly before the present report was submitted for publication, and as it is of such importance to public health administrators it deserves a short review. However, it is extremely regrettable that information concerning the non-European section of the community is still conspicuous by its absence. In spite of the insistent requests of this Department, echoed by most bodies interested in social and health matters, that vital registration of non-Europeans should be made complete and accurate, no progress in this direction has been made. The report of the Inter-Departmental Committee on the Vital Registration of non-Europeans mentioned in the report of this Department two years ago has not yet been implemented.

Though European conditions are fairly fully described, as a summary given in Table 1 shows, no data are available as to corresponding phenomena in the non-European section. The birth rates of the Bantu, Asiatic or Coloured can be but guess-work at present. Death rates, maternal and infantile mortality rates are similarly undefined.

The Report on the Vital Statistics for 1937 in giving certain tables for the Coloured section of the population is an advance on previous issues.

The European birth rate as seen in Tables 1 and 2 was 25 per 1,000 of the population. In the Vital Statistics Report for 1937 an interesting table demonstrates that South Africa in common with all countries where statistics are recorded, shows remarkable differences between urban and rural birth rates. For example, the European birth rate for 1,000 women aged 15-44 in urban areas was 92·96 and for rural areas was the high figure of 132·46.

The natural increase, or the excess of births over deaths, is given for the European population in Table 2. This rate for 1938 was 15·5, one of the highest figures for civilised countries.

The European death rate for 1938 (the crude rate) was 9·48, a slight decrease on that of the previous year. The major causes of death are listed in Table 1. The report of 1937 referred to above, contains an analysis of the principal causes of death for Europeans for the period of 1933-1937, demonstrating that these are—

- (a) heart disease;
- (b) pneumonia;
- (c) cancer;
- (d) violence;
- (e) tuberculosis.

It is a challenge to the public health endeavour of this country that each of these is a cause of so much premature mortality. Many years of useful life would be saved with concomitant advantages to the community and the State if these preventable diseases were more vigorously brought under control. Though the prevention or postponement of mortality is a major function of a public health organisation, mortality indices must not be accepted as the only guide to the success of its efforts. In fact, measured in terms of suffering, impairment or loss of function, economic loss and social disorganisation, it is the forces of morbidity rather than those of mortality which should be the major concern of State medicine. These forces are not necessarily identical, it should be remembered. Tuberculosis is perhaps the only major cause appearing in both morbidity and mortality returns. It is the common cold, influenza and gastro-enteritis, and the infectious diseases such as typhus, malaria, bilharzia, measles and the venereal diseases which are predominantly responsible for the loss of community efficiency and well-being. Therefore, there arises the vital need for more information of the amount and nature of these morbidity processes. Until such intelligence is forthcoming the direction of public health policy is too often empirical.

TABLE 1.—UNION OF SOUTH AFRICA: SUMMARY OF VITAL STATISTICS OF EUROPEAN POPULATION, 1920-1938.

Calendar Year.	European Population (estimated).	Birth Rate per 1,000 of Population.	Death Rate per 1,000 of Population.		Death Rate per 100,000 of Population from				Percentage of Total Deaths, the Cause of which was Medically Certified.	Infantile Mortality Rate (Deaths of Infants under One Year per 1,000 Live Births Registered).	Maternal Mortality Rate (Deaths of Mothers in connection with Pregnancy or Childbirth per 1,000 Live Births Registered).	Survival Rate or Rate of Natural Increase (Excess of Births over Deaths per 1,000 of Population).
			Death Rate per 1,000 of Population.		Diseases of Heart and Circulatory System.	Pneumonia and Bronchitis.	Cancer.	Tuberculosis (all forms).§				
			Actual or Crude.	Standardized.*								
1920.....	1,499,911	28.97	11.09	12.15	95.67†	113.87†	58.94†	46.00†	79.78	90.07	4.10†	17.88
1921.....	1,519,488†	28.44	10.41	11.43	102.91	136.15	69.09	58.26	80.76	77.09	4.94	18.03
1922.....	1,556,241	27.52	9.48	10.41	97.99	127.24	70.88	47.74	82.96	72.91	5.21	18.04
1923.....	1,579,733	26.70	9.77	10.65	108.50	120.72	78.94	46.46	82.77	74.42	5.22	16.93
1924.....	1,610,774	26.29	9.62	10.44	123.92	123.79	76.36	51.59	84.74	73.73	4.75	16.67
1925.....	1,637,472	26.51	9.39	10.15	128.86	97.04	72.86	52.70	86.45	68.39	5.62	17.12
1926.....	1,676,660†	26.16	9.59	10.28	127.21	113.44	71.18	53.41	87.76	64.82	4.56	16.57
1927.....	1,708,955	25.95	9.73	10.34	122.76	110.42	73.20	50.50	89.93	70.62	4.80	16.22
1928.....	1,738,937	25.77	10.15	10.69	133.53	127.72	77.52	50.95	89.93	70.49	4.98	15.62
1929.....	1,767,719	26.15	9.51	9.98	127.11	104.04	77.44	45.37	90.19	64.22	5.26	16.64
1930.....	1,797,900	26.44	9.69	10.08	132.33	112.87	82.62	46.76	91.15	66.84	5.26	16.75
1931.....	1,829,300	25.38	9.37	9.56	131.53	103.75	85.55	44.22	90.46	63.07	4.70	16.01
1932.....	1,859,400	24.17	9.97	9.98	137.52	113.75	89.06	42.33	90.84	68.57	5.31	14.20
1933.....	1,890,300	23.55	9.35	9.27	142.52	100.30	95.33	40.68	91.45	61.01	4.81	14.20
1934.....	1,914,700	23.44	9.68	9.55	156.21	94.53	92.39	39.54	91.91	60.79	5.99	13.76
1935.....	1,973,700	24.18	10.45	10.28	169.58	131.98	95.76	40.44	92.55	62.81	4.73	13.72
1936.....	2,008,700	24.21	9.57	9.50	154.38	106.19	97.28	34.40	92.88	59.06	5.10	14.64
1937.....	2,043,700	24.90	10.08	9.66	172.97	113.62	106.57	36.40	93.17	56.57	4.38	14.81
1938.....	2,081,400	25.01	9.48	**	153.55	102.53	103.44	38.34	94.20	51.69	3.69	15.53

* The rate which would have obtained had the age and sex distribution of the population been the same as that of England and Wales at the 1901 census, the standard usually taken for international comparisons.

† Medically certified deaths only. Rates for subsequent years calculated on total deaths registered.

‡ Actual (per census).

§ Includes Miners' Phthisis combined with Pulmonary Tuberculosis.

** Not yet available.

TABLE 2.— SURVIVAL RATE OR RATE OF NATURAL INCREASE AMONG EUROPEANS IN THE UNION, PER 1,000 OF THE POPULATION.

Year.	Birth-rate.	Death-rate.	Natural Increase.
1911.....	32.2	10.4	21.8
1912.....	32.2	10.3	21.9
1913.....	31.7	10.3	21.4
1914.....	30.2	9.5	20.7
1915.....	29.3	10.3	19.0
1916.....	29.3	10.2	19.1
1917.....	29.0	10.3	18.7
1918.....	28.6	17.2	11.4
1919.....	26.9	11.9	15.0
1920.....	29.0	11.1	17.9
1921.....	28.4	10.4	18.0
1922.....	27.5	9.5	18.0
1923.....	26.7	9.8	16.9
1924.....	26.3	9.6	16.7
1925.....	26.5	9.4	17.1
1926.....	26.2	9.6	16.6
1927.....	25.9	9.7	16.2
1928.....	25.8	10.2	15.6
1929.....	26.1	9.5	16.6
1930.....	26.4	9.7	16.7
1931.....	25.4	9.4	16.0
1932.....	24.2	10.0	14.2
1933.....	23.5	9.3	14.2
1934.....	23.4	9.7	13.7
1935.....	24.2	10.5	13.7
1936.....	24.2	9.6	14.6
1937.....	24.9	10.1	14.8
1938.....	25.0	9.5	15.5

TABLE 3.—COMPARISON OF BIRTH, DEATH AND NATURAL INCREASE RATES AMONG EUROPEANS IN THE UNION WITH OTHER COUNTRIES. AVERAGE RATES FOR THREE-YEARLY PERIODS (BASED ON LATEST AVAILABLE INFORMATION).

Countries.	Birth-rate.	Death-rate.	Natural Increase.
Union of South Africa.....	24.7	9.7	15.0
Holland.....	20.2	8.7	11.5
Portugal.....	27.4	16.0	11.4
Canada.....	20.0	9.8	10.2
Italy.....	23.0	13.9	9.1
New Zealand.....	17.3	9.2	8.1
Australia.....	17.3	9.5	7.8
United States of America.....	17.2	11.1	6.1
Germany.....	19.2	11.7	7.5
England and Wales.....	14.9	12.0	2.9
France.....	14.8	15.2	*

* Decrease of 0.4.

2.—CHILD MORBIDITY AND MORTALITY.

As will be seen from Tables 4 and 5 the European infantile mortality rate for the Union as a whole shows a further satisfactory decrease from 56.57 per 1,000 births for the year 1937 to 51.69 per 1,000 for the year 1938. The decline has been steady, with slight variations, for the past twelve years, and the latest figure of 51.69 compares favourably with that of other countries, and is much the lowest yet recorded. In the individual provinces the Cape shows a slight decrease, Natal an increase from 46.47 to 49.67, Transvaal a decided drop from 60.43 to 53.81, which brings its figures much nearer to those of the other provinces than in former years, and the Orange Free State records a big drop from 51.49 to 43.82, giving this province considerably the lowest figure for the Union. Natal and the Free State, however, base their records on a very much smaller number of local births than the Cape Province and the Transvaal.

TABLE 4.—EUROPEAN INFANTS: BIRTHS AND DEATHS UNDER ONE YEAR REGISTERED AND INFANTILE MORTALITY RATE, I.E. DEATH RATE PER 1,000 BIRTHS, 1919-1938.

Year.	Cape.			Natal.			Transvaal.			Orange Free State.			Union.		
	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.
1919.....	16,749	1,351	80·66	2,910	191	65·64	15,338	1,326	86·45	4,727	382	80·81	39,724	3,250	81·81
1920.....	18,425	1,654	89·77	3,256	235	72·17	16,768	1,576	93·99	4,996	448	89·67	43,445	3,913	90·07
1921.....	18,062	1,382	76·51	3,370	203	60·24	16,582	1,374	82·86	5,288	379	71·67	43,302	3,338	77·09
1922.....	18,248	1,294	70·91	3,294	180	54·64	16,370	1,292	78·92	4,920	357	72·56	42,832	3,123	72·91
1923.....	18,296	1,353	73·95	3,229	197	61·01	15,619	1,261	80·74	5,037	328	65·12	42,181	3,139	74·42
1924.....	18,730	1,296	69·19	3,410	273	80·06	15,287	1,171	76·60	4,919	382	77·66	42,346	3,122	73·73
1925.....	18,366	1,343	73·12	3,509	206	58·71	16,348	1,059	64·78	5,188	361	69·58	43,411	2,969	68·39
1926.....	18,675	1,196	64·04	3,588	189	52·68	16,304	1,186	72·74	5,309	273	51·42	43,876	2,844	64·82
1927.....	18,537	1,293	69·75	3,435	166	48·32	17,050	1,359	79·71	5,325	314	58·97	44,347	3,132	70·63
1928.....	18,032	1,240	68·77	3,514	184	52·36	17,949	1,370	76·33	5,318	365	68·63	44,813	3,159	70·49
1929.....	19,008	1,169	61·50	3,650	177	48·49	18,227	1,342	73·63	5,334	280	52·49	46,219	2,968	64·22
1930.....	19,468	1,332	68·37	3,641	159	43·65	19,108	1,386	72·54	5,317	300	56·42	47,534	3,177	66·84
1931.....	19,180	1,182	61·63	3,538	162	45·79	18,733	1,267	67·65	4,975	317	63·72	46,423	2,928	63·07
1932.....	18,284	1,205	65·90	3,373	204	60·48	18,376	1,402	76·30	4,911	271	55·18	44,944	3,082	68·57
1933.....	17,931	995	54·49	3,441	166	48·24	18,452	1,266	68·61	4,695	299	63·68	44,519	2,716	61·01
1934.....	17,642	1,022	57·93	3,310	157	47·43	19,327	1,279	66·18	4,599	270	58·71	44,878	2,728	60·79
1935.....	18,242	1,016	55·70	3,441	167	48·53	21,109	1,537	72·81	4,925	277	56·24	47,717	2,997	62·81
1936.....	18,162	980	53·96	3,606	189	52·41	22,192	1,454	65·52	4,670	249	53·32	48,630	2,872	59·06
1937.....	18,404	1,012	54·99	3,766	175	46·47	23,814	1,439	60·43	4,894	252	51·49	50,878	2,878	56·57
1938.....	18,727	962	51·37	3,886	193	49·67	24,568	1,322	53·81	4,884	214	43·82	52,065	2,691	51·69

TABLE 5.—INFANTILE MORTALITY RATES: EUROPEANS IN THE UNION COMPARED WITH OTHER COUNTRIES. AVERAGE RATES FOR THREE-YEARLY PERIODS (BASED ON LATEST AVAILABLE INFORMATION).

New Zealand	33
Australia	39
Holland	38
England and Wales	56
Union of South Africa	56
Canada	71
France	66
Germany	63
Belgium	78
Italy	103
Lithuania	120
Portugal	147

As far as can be ascertained there has been no very appreciable increase in infant welfare clinics, but no doubt the steady improvement in the infantile mortality rate must be attributable to some extent to the establishment of such clinics, and also to the spread of district nursing services.

Figures for non-Europeans are still not available, except in the larger urban areas, where they indicate an appalling death rate from preventable diseases. Inclusion of statistics from the rural areas would certainly reveal an infinitely more terrible state of affairs.

Breast Feeding of Infants.—Great attention has been paid recently by the medical press overseas to the subject of the evident decline in the natural breast feeding of infants, and to the reasons therefor. No research on any large scale has taken place on this subject in South Africa, but from general observations it would appear that the same tendency exists here as in the United Kingdom to replace natural breast feeding by artificial feeding. Amongst the non-Europeans this is not the case, and it is a common story to see the perfect specimens of breast fed Native babies become puny little scarecrows of undernourished, pot-bellied “toddlers”, as soon as they are removed from the breast and put on a totally inadequate general diet.

Among the Europeans and non-Europeans the methods taught by the mothercraft nurses trained at the Athlone Institution in Capetown have done much to spread the cult of natural breast feeding in all sections of the community, since advice is open to all who seek it. The possession of the mothercraft certificate must be looked upon as of the greatest value to a district nurse or midwife, and it is gratifying to note that many of them do possess this extra qualification, and are thus enabled to encourage and promote breast feeding.

Probably the majority of mothers discharged from a maternity hospital which is a good midwifery training school, *do* breast feed their babies; but unless there is an efficient “follow up” system, by means of which these same mothers can bring their babies back periodically for advice on the many practical difficulties which later arise, a number of them gives up the breast feeding and resort to the bottle.

Medical men and women in general are neglectful of this aspect of their duty. So also are many midwives who give very little study to the problem, in many cases advocating the artificial feeding of babies as easier, on what ground it is hard to say. The advantages—psychological, physical and economic—of natural breast feeding to both mother and child are so well recognised as to need no emphasis.

3.—MATERNAL MORBIDITY AND MORTALITY.

As will be seen from Table 6 the maternal mortality rate of 3·69 per 1,000 live births shows a further drop from the figure of 4·38 last year. Although many chance factors have always to be considered the steady drop in the figures for the last three years is hopeful, and can cautiously be accepted as evidence of improved midwifery practice. No doubt notifications are still imperfect, but the decrease in numbers of both puerperal sepsis and non-puerperal causes is noticeable. Analysis of the detailed figures of Table 7 shows a fall in the number of cases reported under the causal group “puerperal sepsis”, but a rise in the closely related group “post-abortive” sepsis. The term “puerperal sepsis” needs to be more precisely defined than it is at present. Puerperal pyrexia should also be carefully defined and made notifiable. Only after such precise steps have been taken can we hope to assemble more accurate statistics as to the incidence of puerperal sepsis and allied conditions.

TABLE 6.—MATERNAL MORTALITY: EUROPEANS.

Year.	Live Births Registered.	Deaths due to Puerperal Causes.				
		Number.		Rates per 1,000 Live Births.		
		Puerperal Sepsis.	Other Puerperal Causes.	Puerperal Sepsis.	Other Puerperal Causes.	Total Puerperal Mortality.
1926.....	43,876	88	112	2.06	2.50	4.56
1927.....	44,347	101	112	2.28	2.53	4.81
1928.....	44,809	102	121	2.28	2.70	4.98
1929.....	46,219	140	103	3.03	2.23	5.25
1930.....	47,536	119	131	2.50	2.76	5.26
1931.....	46,423	116	102	2.50	2.20	4.70
1932.....	44,944	126	113	2.80	2.51	5.31
1933.....	44,519	113	101	2.54	2.27	4.81
1934.....	44,878	121	148	2.69	3.30	5.99
1935.....	47,717	119	107	2.49	2.24	4.73
1936.....	48,630	116	132	2.39	2.71	5.10
1937.....	50,878	99	124	1.94	2.44	4.38
1938.....	52,065	78	114	1.50	2.19	3.69

TABLE 7.—EUROPEAN DEATHS FROM PUERPERAL CAUSES BY AGE GROUPS.

Causes.	1937.								1938.							
	All Ages.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45 and Over.	All Ages.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45 and Over.
Post Abortive Sepsis.....	21	2	4	2	2	6	4	1	31	2	3	9	7	8	2	—
Abortion—not returned as Septic.....	8	—	1	2	4	1	—	—	8	1	1	3	2	1	—	—
Ectopic Gestation.....	7	—	2	1	2	2	—	—	8	—	—	4	2	1	1	—
Other Accidents of Pregnancy.....	1	—	1	—	—	—	—	—	1	—	1	—	—	—	—	—
Puerperal Haemorrhage.....	31	2	6	6	8	7	2	—	35	—	3	9	6	12	2	3
Puerperal Sepsis.....	78	7	16	18	17	12	7	1	47	3	12	13	10	4	2	3
Puerperal Albuminuria and Convulsions.....	24	3	4	2	6	7	1	1	30	1	5	9	6	4	4	1
Other Toxaemias of Pregnancy.....	3	1	—	2	—	—	—	—	4	1	—	—	3	—	—	—
Puerperal Phlegmasia—Alba Dolens, Embolism and Sudden Death.....	15	—	4	4	4	1	1	1	7	—	—	2	2	3	—	—
Other Accidents of Childbirth.....	29	—	7	5	6	7	3	1	20	1	4	3	6	5	1	—
Other or Unspecified conditions of the Puerperal State....	4	1	1	1	1	—	—	—	1	—	—	1	—	—	—	—
Puerperal Diseases of the Breast.....	2	—	1	—	—	—	1	—	—	—	—	—	—	—	—	—
TOTAL.....	223	16	47	43	50	43	19	5	192	9	29	53	44	38	12	7

The inclusion of figures for septic abortions in this group would considerably increase it. Probably far too many such cases occur, e.g. 31 out of a total of 192 deaths as recorded in last year's figures. This incidence confirms the opinion already expressed that well controlled birth control clinics are necessary to promote the public health. At present the alternative too often is untimely deaths due to abortion.

Lack of sufficient and efficient prenatal care would seem to be reflected in the following figures:—

Puerperal Albuminuria and Convulsions	30
Other Toxaemias of Pregnancy	4
Accidents of Childbirth	20

This total of 54 out of 192 deaths, and a further 35 deaths from puerperal haemorrhage come within the group of possibly preventable deaths. With these points in view the conclusion is inevitable that a large number of maternal deaths reported is preventable, and great improvement is called for in midwifery services.

In spite of the inauguration of a district nursing service, which includes district midwifery services, a great many cases are still attended by totally untrained women. We are still in the very unfortunate position of not having sufficient trained midwives or doctors available to dispense entirely with the services of the untrained midwife.

The position on the whole is improving owing largely to the detailed inspections of individual midwives which have been carried out by the department's nurse-lecturers during the last three years. The worst of the offenders have been prohibited from practising.

Extension of control of midwifery services by local authorities proceeds slowly. Applications have been received from two further Divisional Councils in the Cape Province, Knysna and Caledon, to have the provisions of the regulations applied to their areas. Such enterprise is laudable, but can only be successful in conjunction with the provision of an adequate district midwifery service for the area concerned.

Hospitalisation of Normal Maternity Cases.

Provision of institutional beds for normal maternity cases is still entirely inadequate throughout the country. This state of affairs continues to be a menace to the health and welfare of our women and children. The abnormal case is admitted to any Provincial hospital, but public hospitals, with few exceptions, refuse to admit normal midwifery cases unless they are paying cases, in which event accommodation is made available. The result is that the pauper or the woman who can afford only a small fee is doomed to a confinement in her own home, which is usually overcrowded, often dirty and thoroughly unsuitable. The resultant difficulty to the midwife, and the possibility of infection cannot be exaggerated. Many more women would be safely confined in clean surroundings if sufficient accommodation were available for them, but unfortunately the viewpoint of many is still that "midwifery is not sickness", therefore there is no obligation on a State hospital to provide beds for such women, unless they can pay.

Family Spacing.

The Department has once more renewed its grant of £1,000 to the South African National Council for Maternal and Family Welfare, with the main object in view of extending this work, which is considered an essential to the public health, from urban to rural districts. It is indicative of public opinion on the matter that so many women's organisations have expressed themselves in favour of family spacing, the first Afrikaans women's organisation to do so being the Afrikaanse Christelike Vroue Vereniging. This example has since been followed by others.

4.—INVALIDITY.

The incidence of sickness is difficult to estimate. Apart from certain infectious diseases which are compulsorily notifiable, there is no complete registration of invalidity or sickness. A complete record of the other forms of sickness could only be furnished by obtaining a return of all patients who are treated at all the hospitals and by all the practitioners of medicine, and even then we should not be including persons suffering from ill-health who failed to seek medical advice. It is also a well-known fact, that deaths are a very misleading index of the incidence and nature of sickness and invalidity.

One of the basic principles which must be fulfilled before the foundations of a sound national system of public health can be laid, is that there must be accurate ascertainment and registration of data relating to population, especially the birth, mortality, and morbidity rates. These data provide the intelligence service, without which proper organisation, long term planning and economical expenditure of money and energy in public health fields cannot be made.

Information, admittedly defective and incomplete regarding population, births and deaths, is even more so regarding the incidence and nature of sickness.

“ The poor are ill and the ill are poor ” is a true saying as the sick or disabled wage earner is bearing a triple economic burden. In the first place he is usually causing loss of output and efficiency for the factory, office, shop or farm where he works. Next he is losing the income for his own family and is often cutting into future income and consumption by incurring debts. Then, if he has to be removed to an institution, he is incurring an extra maintenance cost which has to be borne by someone and finally he is giving rise to expenses such as medical attention and nursing, drugs, medicines and appliances.

The money value of the work lost through sickness, absence from regular employment and the cost of maintenance and treatment of sick persons in private practice, in institutions, private, state-aided, or entirely run by the State, could possibly be computed. Many of the costs of ill-health cannot, however, be measured in money. The subjective element of pain and suffering cannot be estimated. Nor can the contribution to the community of this regrettably large body of persons struggling with invalidity be computed.

Since the whole social fabric of the life and labour of the people is intimately bound up with individual and communal health or ill-health, an appraisal of the causes of invalidity needs a great widening of scope and outlook. Social and economic problems largely lying outside the concern of existing health services, usually determine the national health. Such are agriculture, nutrition, wages, housing distribution, transport, social and economic conditions and public relations. Every agency liable to create ill-health should be examined in order to eliminate or reduce the risk.

Finance being as often as not the determining factor in the causation of ill-health, there is a constant danger of a humane and at the same time a hard-up community using its funds for the alleviation of cases which stir pity, and not for constructive and preventive measures. A preponderantly salvage policy brings poor or no returns in the future.

At present we have a bewildering number and variety of agencies, official and unofficial, created to work in the field of health and dependency. Control, continuity and co-ordination are lacking, with the result that millions of pounds are being spent in caring for the victims of accidents and illnesses which need never have occurred had a fraction of this amount of intelligence and money been devoted to tracing and adjusting the social and economic causes.

Various schemes to assist invalids are at present administered by the Government. The Department of Social Welfare is mainly responsible for such relief. It makes grants to totally and permanently mentally and physically unfit persons, answering a means test. This is an administrative scheme and not entrenched by statute. The amount so spent annually is £175,000 and new applications are not diminishing but increasing every month.

An analysis of the causes of invalidity for which grants became payable since the inception of the scheme on the basis of the classification used by the Department of Social Welfare gives the following results:—

	Per cent.
1. Diseases of the heart and circulatory system	20·16
2. Mental conditions	17·95
3. Defective limbs and deformities	12·18
4. Rheumatic group	10·66
5. Diseases of the brain and spinal cord	9·34
6. Diseases of the lungs and larynx, etc	9·20
7. Unclassifiable	6·22
8. Miscellaneous (deafness, partial blindness, simple tumours, etc.)	5·47

The Social Welfare Department also pays mother's pensions to families where in many cases eligibility is due to the fact that the breadwinner is invalided. Grants-in-aid are also paid to institutions for the blind, deaf and epileptic.

The Pensions Office administers the military pensions scheme, old age pensions and pensions for the blind. The following amounts are paid:—

1. Military pensions	£604,000
2. Old Age pensions	£2,353,000
3. Blind persons	£59,000

The Department of Labour subsidises municipalities and divisional councils to employ semi-fit men who, on account of their invalidity, would ordinarily not be absorbed in the labour market.

The Department of Public Health pays grants to discharged lepers where the disease has become arrested and who are incapacitated by the disease and in need of assistance.

The Department of the Interior pays maintenance grants in certain cases of mental deficiency.

These are some of the types of invalidity for which the State has assumed partial responsibility without being in a position even remotely to estimate actuarially what the cost in public funds directly disbursed is ultimately going to be, or without being in a position adequately to control by preventive measures, the growth of this volume of invalidity.

It is vitally important to know what ill-health is costing because public health is purchasable. It must be realised that the returns are not immediate. We are concerned here with a long-term investment; the money is sunk in maternity and child welfare, in good schools and school medical inspection and treatment, in sufficient pure, and balanced foods, in clean streets, in sanitary houses, in abundant and clean water supplies, in dispensaries, clinics, hospitals, sanatoria and social services. These are or should be essentially the preventive services. Are we spending enough on these and are we getting value for each pound spent?

It is impossible here adequately to summarise the figures relating to the cost of ill-health, or to tabulate all the causes, nature and degree of ill-health, but by analysing some of the types of invalidity for which salvage money is being paid, as indicated above, by various Government departments, it may be possible to demonstrate where the health defences are being breached and where additional reinforcements and defensive works should be thrown up.

Adult unfitness often has its origin in the period of childhood or even during the term of gestation. It may therefore confidently be expected that if physical and mental handicaps are suitably dealt with during that period, the incidence of invalidity and unfitness amongst adults will be appreciably diminished.

The greater attention which is now being paid to school medical treatment and the nutrition of the school-going youth, the special schools or classes for such cases as the mentally subnormal, the deaf and hard of hearing; provision for cripples and epileptics and sight saving classes, must ultimately substantially reduce dependency on the State of such adult semi-fits or unfits. It is, therefore, the more regrettable that not more is being done for the pre-school child, who may enter school already damaged.

Much ill-health and invalidity in adult life, however, is occasioned by malnutrition and poor housing. The existence of these defects tends to neutralise even the best services which may be given at maternity and child welfare centres, nursery schools, school clinics, hospitals, sanatoria, or through a national health insurance scheme.

In other subjects treated in this report the multiplicity of authorities concerned in health, the overlap on the one hand and the inco-ordination and neglect on the other hand, have been revealed. In such a subject as invalidity it now also becomes apparent that there are many anomalies and inco-ordinations. Consolidation and integration of services concerned in treating invalidity is desirable.

II.—ENVIRONMENTAL CONDITIONS.

5.—INDUSTRIAL HYGIENE.

The great gold mining industry has presented certain hygienic problems which are of such interest and importance that they have completely overshadowed other aspects of industrial hygiene in this country. The growth of secondary industries and the increasing industrialisation of the country generally have, however, given rise to other industrial hazards which will undoubtedly become increasingly important.

The problems which have been associated with gold mining on the Witwatersrand are well known; they are of such importance that a brief résumé of the position in regard to certain matters will not be inappropriate. In the early days "miner's phthisis" threatened seriously to interfere with the development of the industry. The fine silica dust results in the production of a fibrous condition in the lung tissues known as silicosis. This in turn renders the lungs more vulnerable to attack by the tubercle bacillus

and tuberculosis is apt to develop. The term "miner's phthisis" is, however, a misnomer as it implies that all persons affected have phthisis or tuberculosis and are therefore a source of infection to their fellow-men. This is not the case as many of them have silicosis without open tuberculosis and are in no way a danger to other people. The problem has been energetically tackled by the Mines Department and the mining industry. The Miners Phthisis Medical Bureau, a division of the Department of Mines, is responsible for the medical selection of all European underground mine employees and also for their subsequent re-examination at six monthly intervals. A high degree of physical fitness is required before any man may be engaged for underground work. The periodic re-examinations serve to detect any cases of silicosis or of active tuberculosis and the latter are removed from underground work. The Natives are all, of course, medically examined before they are engaged. They are re-examined at intervals and, as with the Europeans, an accurate record of weight is kept; if there is any significant loss of weight or any suspicion of lung trouble a very searching clinical and X-ray examination is carried out. Men found to be affected with silicosis are classified into certain grades; compensation is awarded to them in proportion to their degree of disablement, or in the case of death, compensation is paid to their dependents according to a definite scale. In addition to this the problem has been tackled at its source by improving working conditions underground. Improved methods of mining, such as elaborate and scientifically controlled methods of ventilation, control of times of blasting and wetting of the dust caused in drilling by means of water feeds to the drills have all helped to reduce the dangerous dust. By these two methods, improved mining conditions and very careful selection and medical supervision of all underground workers, the risk of silicosis has been very greatly reduced. Investigations into methods which might be introduced still further to improve the position are constantly being carried out.

Another matter of very great importance is the prevention and treatment of accidents which are almost inevitably associated with dangerous industrial undertakings such as mining. It is, of course, a well-established principle that the prevention of accidents and the prompt and efficient treatment of all accidents which do occur is not only a fundamental duty of the employer but is also an undertaking which repays him several fold by the improved efficiency of the labour force and by the avoidance of high medical expenses. This fact is well recognised by the gold mining industry and is acted upon to the full. There is a strong body known as the "Prevention of Accidents Committee", on which this Department is represented, which deals with the various aspects of this problem. The efforts of this committee have achieved a very considerable measure of success. In addition to this the training of both Europeans and Natives in first-aid has been actively carried out for some years and the first-aid organisations on the individual mines have reached a high degree of efficiency.

Pneumonia has been one of the principal causes of illness and death among the Native labourers on the Witwatersrand gold mines. Improved living conditions directed towards diminishing the spread of infection and increasing the resistance of the Natives have resulted in a fall in morbidity and mortality from this cause. One of the factors involved is the provision of jackets to Natives working underground; these are put on by the Natives when they are wet and hot before they come up to the cooler conditions on the surface. A development of the same principle would be the provision of change houses for Natives at shaft heads, but as these are expensive they are only provided in a very few instances. Their general adoption may be a counsel of perfection, but it would certainly be a great improvement on existing conditions. The recent introduction of the drug M. & B.693 in the treatment of pneumonia promises to be an important step in reducing mortality from this disease.

Underground sanitation is a matter of considerable importance both from a generally hygienic point of view and in regard to the spread of hookworm. The warm and humid conditions underground are favourable to the development and survival of the larvae of *Ankylostoma duodenale* and for this reason steps have been taken to prevent spread of the disease. Underground latrines are well constructed with impervious floors and walls, while salt, which kills the hookworm larvae, is freely used in the pails, on the walls and floors of the latrines and in the skips used for removing the pails. Natives coming from tropical and sub-tropical regions are not infrequently found to be infested with hookworm; but the careful methods used in underground sanitation have been successful in preventing the spread of this condition to other workers in the mines.

Another important problem has been that of heat stroke. This is a serious condition which is liable to occur when labourers are working under conditions where the temperature and humidity are high. Such atmospheric conditions inevitably arise in deep mining where water is used to damp the silicosis-producing dust unless careful measures are taken to prevent their occurrence. This problem has been tackled in an efficient manner along

two lines—acclimatisation and ventilation. It has been found that acclimatisation is of great value and all new boys are systematically acclimatised before being sent to hot working places. The methods vary somewhat on the different mines, but the general principle is the same throughout. The Native is gradually accustomed to doing more physical work in underground conditions before he is required to do a full day's work under the hot and humid conditions prevailing on the deep levels. In the prevention of heat stroke, as in that of miner's phthisis, an elaborate system of ventilation has also played a very important part. Each of the large mines employs skilled ventilation officers and the whole system is very efficiently organised. Satisfactory ventilation of all working places is one of the essentials for safe underground working.

Apart from gold mining other types of industry in which occupational diseases are liable to arise are developing in various parts of the country. Hygienic conditions in industry are controlled by the Factories Act and the regulations framed thereunder, while the general safety of workers is also controlled by the Mines and Works Act and its regulations. The Factories Act, which regulates a large number of matters affecting the health of workers, is administered by the Department of Labour through its factory inspectors. These officials have at their disposal the technical advice of officers of this Department where this is required in connection with medical and public health problems, and it is hoped that as the necessity arises this relationship between the two departments will be considerably developed.

Lead poisoning is an aspect of industrial hygiene which will undoubtedly assume a greater degree of importance in this country, as it has in other parts of the world, with the development of the motor industry. The assembly of motor bodies and the manufacture of electric storage batteries are both associated with considerable hazard unless adequate steps are taken to eliminate fine lead dust from working places, and to ensure that foodstuffs do not become contaminated with lead. During the course of the year at least one severe case of lead poisoning occurred in a worker in a battery factory. This has drawn attention to the absolute necessity for adequate steps being taken to prevent lead poisoning by inhalation and ingestion, for the wearing of protective clothing and for the regular medical examination of those employees exposed to the hazard. Another source of lead poisoning, to which attention was drawn in the Department's report last year, is from brandy contaminated with lead from lead piping in stills or from lead solder used in repairs to brandy stills. Some cases of lead poisoning which were almost certainly due to this cause were brought to the notice of the Department last year. The cases were in the Cape Province; it was thought that the trouble arose from private stills used by farmers. It is gratifying to be able to record that a regulation has since been promulgated under the Customs and Excise Duties (Amendment) Act preventing the use of lead in stills and that all Inspecting Excise Officers visiting farmers who distil brandy have been instructed to draw their attention to this regulation and to warn them accordingly.

One of the common forms of industrial disease in many countries is occupational dermatitis. This does not as yet appear to have given rise to much difficulty in South Africa but with increasing industrialisation the possibility of such diseases arising cannot be ignored. The factory inspectors, being fully alive to this, lay stress on adequate cleansing facilities being provided in factories where conditions might otherwise give rise to various forms of dermatitis. Skin diseases which occur in industrial workers are a potential source of ill-feeling and dispute between employers and employees because of the difficulty of determining whether such diseases are the result of working conditions. In this connection it should be pointed out that individual skins differ very considerably in their degree of resistance to chemical and mechanical irritants and accordingly it is desirable to insist on careful medical examination and selection of prospective employees in those industries in which industrial dermatitis is liable to arise.

Apart from frank manifestations of disease, such as those to which reference has been made, industrial conditions may have a deleterious effect on the general health of the workers, unless adequate measures are taken to ensure that this does not occur. It is evident that in view of the increasing industrial development which is almost certain to occur in this country the science of industrial hygiene will play an increasingly important rôle in public health activities.

6.—LIVING CONDITIONS AFFECTING NATIVE LABOURERS.

In spite of its vast sparsely populated areas, South Africa is very largely an industrial country and it is fairly safe to assume that it will become more and more industrialised. By far the largest industry is mining, and gold mining constitutes by far the greater proportion of the mining industry. This is well illustrated by the numbers of Native workers. There are on the mines of the Witwatersrand nearly 330,000 Natives employed in the gold mining industry, in other words, a group of men

which in numbers is approximately equivalent to one-sixth of the total European population in the Union, and is considerably greater than the whole European population of Johannesburg. Coal mining is carried on fairly extensively in certain areas in the Transvaal and Northern Natal; this industry employs some 30,000 Native workers. The numbers employed on the diamond and base metal mines are much smaller.

It is generally recognised that the large Native population available for labour is one of the greatest assets of the country. It must be appreciated that it is our duty from a humanitarian point of view to preserve and improve the health of this large section of the population; while, looked at purely from an economic standpoint, it is necessary in the interests of the Europeans to maintain and develop this asset to the best of our ability. These objects may be attained by a more enlightened and progressive public health policy in the Native territories and by taking all possible steps to improve the health of the Native workers in industry. The former matter is dealt with in another section of this report, and it is with the latter problem that we are now concerned.

The Government section directly responsible for the control and welfare of the Natives employed in industry is the Directorate of Native Labour, a division of the Department of Native Affairs. The Chief Native Commissioner for the Witwatersrand, who is also the Director of Native Labour, is stationed in Johannesburg and is responsible for the administration of the Native Labour Regulation Act (Act No. 15 of 1911) and the regulations framed thereunder. This Act and its regulations govern the conditions of employment of Native labourers in proclaimed labour districts. Labour districts are such as are so proclaimed by virtue of the fact that they contain a large number of mining or other industrial concerns employing Native labourers, as defined in the Act. The conditions under which Native labourers live are controlled by certain requirements of the regulations framed under this Act which deal with housing, diet, hospital accommodation and other relevant matters. The Public Health Act is of general application in so far as ordinary public health matters are concerned, but specific requirements in regard to the matters referred to above are laid down in the regulations framed under the Native Labour Regulation Act.

The Witwatersrand is, of course, by far the most important industrial area in the country and the conditions under which the Native labourers live on the gold mines are of great public health importance. The majority of the Witwatersrand gold mines falls within the area of jurisdiction of the various Reef municipalities. Until a few years ago, the Johannesburg Municipality was the only local authority on the Witwatersrand which employed a full-time Medical Officer of Health and which had a fully equipped and staffed public health department. Accordingly the degree of interest and public health control exercised by the various municipalities in regard to the mines in their areas varied very considerably. It was for that reason deemed advisable ten years ago to station a senior professional officer of this department in Johannesburg, primarily to advise the Director of Native Labour in regard to public health matters. With the improvement in municipal health organisation it has now become possible for the officer concerned to undertake a great variety of additional duties. During the last few years all the Reef municipalities except Randfontein and Nigel have appointed full-time Medical Officers of Health and have developed properly staffed health departments. These local authorities are now in a position to take a much more active interest in public health conditions on the mines in their areas. As the Native commissioners and inspectors of Native labour working under the Director of Native Labour have for many years exercised their functions in regard to inspections of mine compounds, it was felt at first that there might be some degree of overlapping between these officials and those of the municipal health departments. By a process of co-operation it has, however, been found possible to avoid any serious difficulties which this might have created, and the inspectors of Native labour continue to exercise those functions which are provided for in the Native Labour Regulation Act, while the municipal health departments exercise ordinary public health functions such as are provided for by the Public Health Act. This involves inspections of the compounds being carried out by both sets of officials, but, with tact and goodwill, this has proved to be to the benefit of both parties in the majority of cases.

As is well known, the gold mining industry is very highly organised and the industry as a whole appreciates to the full the necessity for healthy conditions among its Native employees. Standards of compound hygiene have improved as new types of structure and new ideas have evolved. For this reason it is obviously not to be expected that the standard of hygiene in compounds throughout all the mines on the Reef will be uniform. The standard is, however, in general very high. This naturally applies more particularly to the newer mines which have constructed compounds in accordance with modern ideas. The general living conditions and the

Natives' diets, which are laid down in the regulations framed under the Native Labour Regulation Act, are satisfactory, and are such as to favour a high standard of health among this large labour force.

There is one important matter in regard to which satisfactory arrangements have not as yet been made. This is the control of the health conditions prevailing in the married locations on the mines on the Reef. The Natives living in these married quarters form only a very small proportion of those employed on the mines. Provision is made in the Native Labour Regulation Act for the framing of regulations to control the conditions in married quarters in labour districts. Such regulations have been framed for many of the labour districts but, curiously enough, have not been framed for the most important labour district of all, the Witwatersrand. The regulations which exist in other labour districts are not uniform and for this reason it has long been felt that uniform regulations should be promulgated and should be applied to all labour districts in the country. The problem was tackled during the year by a committee convened by the Director of Native Labour on which this Department was represented. The committee comprised representatives from all the interested parties, the Native Affairs Department, the Mines Department, the Mining Industry, the Local Authorities, the Police and the Union Department of Public Health. It was thus possible to discuss the various measures which were proposed from every point of view. After prolonged and careful deliberation the committee drew up draft regulations which it was suggested should be made applicable throughout the country. These draft regulations deal with a great variety of matters of control and of a public health nature. Owing to the fact that it was desired to make the regulations applicable throughout the country, it was thought wise that they should be so framed that considerable powers of discretion would be left in the hands of the Director of Native Labour. This was necessary because the conditions obtaining in many of the labour districts are essentially rural whereas those obtaining on the Reef are, of course, those found in large urban areas. For this reason the requirements in regard to the construction of the dwellings dealt briefly with certain important principles and were expressed in the negative so as to allow of great elasticity. One important principle which was embodied was that where industrial concerns wished to establish locations in local authority areas, these locations should comply with the public health and building requirements of the local authority concerned. This is a very important measure from a public health point of view, as it is in accordance with the principle of delegation embodied in our Public Health Act by which local authorities are made responsible for health conditions in their respective areas. Incidentally this is a very good indication of the degree of co-operation existing between the Department of Native Labour and the local authorities. The draft regulations have not as yet been promulgated but are under consideration by the Department of Native Affairs.

The shortage of Native labour which has recently been experienced on the Reef has given rise to some concern. It was caused by the very great expansion which has taken place in the gold mining industry during the last few years. Until recently the recruitment of tropical Natives for work on our mines was prohibited on account of the high incidence of pneumonia which occurred among these Natives when they were originally brought to the Reef. The Natives to which this prohibition referred were those from the Rhodesias, Nyasaland and from those portions of Bechuanaland Protectorate and Portuguese East Africa lying north of latitude 22° south. With the improvement in hygienic and other conditions this tendency to contract pneumonia has largely disappeared. What appears to be a further great advance in this connection is the introduction of the drug M. & B.693 for the treatment of pneumonia. Published results up to the present seem to show that the use of this drug has reduced the mortality rate from pneumonia very markedly, and it is anticipated that it will play a large part in still further improving the position. On account of these factors permission has now been given to recruit labour from these tropical areas in much greater numbers. Great care is, however, still exercised and in this connection it should be mentioned that the Witwatersrand Native Labour Association has recently erected a compound and hospital on the East Rand with the object of receiving and acclimatising tropical Natives there before drafting them to the various mines. It is considered that this arrangement will be more satisfactory than the method previously obtaining by which the Natives were acclimatised on their respective mines.

As indicated earlier in this chapter, the living conditions of the Natives on the Witwatersrand gold mines are in general satisfactory. Unfortunately this cannot be said of many of the smaller mines in other parts of the country. A disturbing factor is that the mortality on the coal mines of the country as a whole is very considerably higher than that on the gold mines. Statistical data are furnished by the Department of Native Labour each month. While it is not proposed to quote these in any detail a few remarks are relevant. For the year under review the death-rate from disease among Native labourers on the gold mines was 4.12 per 1,000, while for the coal mines the corresponding figure was 9.73. The death-rate

from accidents is given each month and, in regard to this too, the rate for the coal mines is almost consistently higher than that for the gold mines, although the difference in this case is not so marked. It is not possible to determine all the reasons for these differences with any degree of certainty; but it is felt that there are probably several factors involved. It seems probable that one of the most important factors is that the selection of Natives for these smaller mines is less thorough and rigorous and therefore the type of Native employed is not so physically fit as in the case of the gold mines. While admitting that this is a factor we feel that in all probability there are other important causes contributing to the higher mortality rates on the coal mines. Inspections of the living conditions of the Natives on some of these mines which have been carried out during the year show that in most cases the conditions are not nearly so satisfactory as on the large gold mines of the Reef. The general standard of compound construction is, with few notable exceptions, not comparable with that on the Witwatersrand. Living rooms are in many cases of an old design while the other buildings such as kitchens, latrines, washrooms and hospitals are usually of a much more primitive type than those on the Reef. In many cases water supplies are not above suspicion, while in certain instances they are quite obviously subject to pollution. The majority of these mines have locations for their married Natives and in many cases these locations are unsatisfactory. The feeding of the Natives is controlled by the ration scales laid down by regulations. The improvement of conditions on these smaller mines is usually a matter of considerable difficulty, as in many cases the mining companies are not financially strong enough to erect up-to-date compounds and provide the public health amenities which are enjoyed by the Natives on the Reef. It is felt, however, that this question is one which needs careful attention and it is hoped that by a process of repeated visits it will be found possible greatly to improve the living conditions on the majority of the smaller mines in the country. It is considered that it is these small mines situated in the country districts which require much more attention from this Department than do the large concerns on the Reef.

A matter of very great importance which has received attention during the year is the question of the feeding of recruited Native labourers. The regulations framed under the Native Labour Regulation Act lay down that no contract of service, under which it is provided that a Native shall receive rations, shall be attested or registered unless a scale of rations has been prescribed in respect of the particular employment for which the Native is recruited or unless the quality, nature and minimum scale of rations are specified in such contract of service. The position in regard to this is that the only employment for which a scale of rations has been prescribed is mining and accordingly, in the case of Natives who are recruited for other industries or for farm labour, the particulars of the diet to be provided must be specified in the contract of service. The Director of Native Labour, therefore, approached the Department with the request that a diet scale might be drawn up to serve as a guide for him in considering the proposed ration scales which are submitted to him. A scale which was considered physiologically suitable for labourers was therefore drawn up with the expert advice of the senior dietitian attached to the Department and several alternatives to the different articles on the diet scale were suggested in order to allow for the varying conditions of the availability of different foodstuffs in various parts of the country. After discussion with the Director of Native Labour it was decided that, although the suggested diet was somewhat elaborate and although it would not be possible at this stage to enforce its general adoption, it would act as a very useful guide in considering proposed ration scales. It was felt that the present position in regard to certain industries, and perhaps more particularly in regard to recruited farm labour, was so bad that some improvement was essential even though it might not be possible to attain the ideal. It has not been found possible to insist on diet scales which would be acceptable as entirely satisfactory to this Department; but compromises have been effected having due regard to the conditions prevailing in the various industries and in the different farming areas. It is certain that, if the agreements which have been drawn up in regard to the feeding of Native labourers falling under these regulations are adhered to, the position will be very greatly improved. It is to be remembered that it is only to recruited labour that these regulations apply.

The unsatisfactory feeding of farm labourers in general is a matter which has received considerable publicity recently. It is evidently becoming generally realised by the public that the present scarcity of farm labour is largely attributable to the unsatisfactory conditions of employment and more particularly the bad feeding conditions prevailing on farms, and that it is only by an improvement in these matters that the present difficult position of the farmer will be alleviated. It is gratifying to note that it is not only the Government Departments of Public Health and Native Affairs which are exercised in regard to this important matter, but that the public is gradually becoming aware of the position and that there

is a tendency towards the adoption of a more enlightened attitude in this regard. It is felt that the better feeding of Native labourers would have the twofold effect of improving the health of the Natives and of increasing the efficiency and amount of available Native labour and thus, taking the long view, it would be to the benefit of the employer as well as the employed.

It is evident that a great deal has been done, particularly by the large gold mines, to improve the health of the Native labour force; nevertheless a great deal still remains to be done especially in the case of Natives employed on small mines, in other industries and on farms. It is hoped that the good example which has been shown by the Witwatersrand gold mines will lead to a more general appreciation of the benefits to be derived from a healthy labour force and to a more enlightened outlook in regard to this matter.

7.—SANITARY AND HEALTH CONDITIONS OF CERTAIN PERI-URBAN AREAS.

In the areas immediately surrounding the larger towns, settlements of both Europeans and Natives are very prone to develop under conditions which are uncontrolled from a public health point of view. In these circumstances conditions of gross insanitation and other factors detrimental to the public health frequently arise.

The housing of Europeans in these peri-urban settlements is often very primitive, as there is no local authority or other responsible body to see that houses are constructed with proper regard to conditions affecting health. Sanitary arrangements are often of the most primitive type. They usually consist of either a crude pit privy, constructed without regard to the possibility of pollution of underground water supplies, or a rough shelter serving as a pail latrine and provided with a paraffin tin or other such receptacle. In either case the faeces are usually freely exposed to flies and in the case of the pail latrine the contents are frequently buried on the plot without the exercise of much discrimination. Household and other refuse, particularly animal manure, is allowed to accumulate in heaps, so that fermentation and decomposition takes place with resultant fly breeding in the summer months. These flies feed indiscriminately on anything from human or other faeces to the contents of the domestic milk jug or sugar basin and carry filth and infection with them wherever they go. In this way flies are responsible for the spread of a great deal of acute illness of intestinal origin such as typhoid and summer diarrhoea. Both these diseases are prevalent and of great importance in the areas under consideration, summer diarrhoea being one of the most important causes of infantile mortality. Water supplies are frequently obtained from shallow wells on the individual plots and, in view of the primitive methods of sanitation which prevail, the risk of pollution of these wells is very great as they are seldom constructed with any idea of prevention of pollution. They are usually uncovered and are therefore exposed to contamination. The water is generally drawn up with an old paraffin tin or bucket which takes down with it a considerable quantity of dirt, containing bacteria of all sorts, each time it is lowered. Other common sources of water supply such as irrigation furrows and streams are equally dangerous. In fact these rural water supplies are almost invariably badly polluted and it is only necessary for pollution with the bacteria of typhoid or some other pathogenic germ to take place for an epidemic to originate. Meat supplies in these areas are usually obtained from primitive slaughter poles which are usually of a very unhygienic type, and are conducted without regard to the safety of the consuming public, while meat inspection is entirely lacking. The conditions of bad housing, primitive sanitation and polluted water supplies are a constant menace to the health of these communities and incidentally to that of the communities in the neighbourhood in spite of the fact that the latter may be living under properly controlled hygienic conditions. If anything can be said in favour of these peri-urban settlements it is that there the poorer type of European is able to live comparatively cheaply and can augment his family food supplies with vegetables and milk produced on his own premises.

These peri-urban settlements, which have developed to a considerable extent around most of the big centres of population, are largely caused by the drift of the European community to the towns which has taken place during the last few years. The attraction of the fixed wages paid by the mines and other industries has caused a great influx of the poorer type of European rural inhabitant towards the larger centres of population. These people, essentially of rural origin, have a deeply ingrained love of the land and a strong desire for ownership of some piece of land, however small. A still more potent factor is the poverty of the lower wage earners which induces them to try to avoid the higher living expenses of town life and particularly the payment of rates. These considerations combined with their spirit of independence and their dislike of authority encourage them to settle in these uncontrolled areas on the outskirts of the towns,

From the public health standpoint the dangers of such settlements are due to the complete lack of control of living conditions. In the Transvaal, Orange Free State and Natal there is no form of rural local authority with the exception of the mining commissioner, on certain alluvial diamond diggings, and the magistrate who acts in this capacity where no other local authority has been established. The magistrate, however, has not the necessary machinery for dealing with the public health problems which arise in these areas. Even in the Cape Province, where rural local authorities exist in the form of divisional councils, these, with very few exceptions, have not the necessary machinery to enable them to exercise effective public health control in their areas. The peri-urban dwellers, from the very nature of things, are not usually of the type of person who has a proper appreciation of hygienic requirements. These people, as previously mentioned, are mostly drawn from the poorer strata of the farming community, who for generations have been used to wide spaces, where insanitation is largely counteracted by the purifying processes of the elements. These natural processes are unfortunately much less potent under conditions of closer settlement. Conditions of insanitation which in a widely scattered rural community do not give rise to epidemics must be viewed quite differently when the conditions of settlement are such as obtain in these peri-urban areas. With closer settlement accumulations of refuse and excreta become potentially far more serious and the possibility of dangerous pollution of water supplies is much greater. The people occupying these settlements are usually found to be strongly opposed to the establishment of any form of local government; this opposition is engendered by their inherent distaste for authority of any sort as well as by their fear of increased expenditure which might be occasioned by the provision of services by a local authority. Not only is the proposed establishment of a local authority generally met with the strongest opposition; but it must be admitted that, even when a local authority is established, it is sometimes very difficult for it to function satisfactorily. These settlements are almost invariably comparatively scattered and the expense of rendering services, such as the provision of a proper piped water supply and a satisfactory system of sanitation, is usually a financial burden which is so great that it is almost impossible for the community to meet it. A great deal could be done, however, to improve existing conditions. Short of providing services which would be looked upon as really satisfactory from a public health standpoint much could be done at a reasonable cost.

The provision of a safe water supply is usually the most difficult problem. Where borehole water is obtainable it is mostly safe and, except in unusual circumstances such as where it is brak, it should always be used in preference to well water. Deep wells which pass through an impervious stratum are safer than shallow wells, as the chances of pollution passing through the soil are diminished. A very important source of pollution of wells is, however, from the surface; wells which are not covered over are liable to pollution from storm water containing surface washings including human and animal excreta and other dangerous material. It is usually possible to protect the surface of a well at no great cost by providing a concrete platform properly drained to lead spillage away from the well; in addition to this it is essential that a hand or other pump should be provided, so that it is not necessary to lower a receptacle into the well to draw water. A type of latrine which is far better than that usually seen can be provided quite cheaply. The main difficulty is to avoid the pollution of water supplies and when the community is dependent upon shallow wells this may be very difficult unless the plots or holdings are large or unless some system of sanitary removal is adopted. Where human faeces are disposed of in the ground on the plot, whether directly into a pit privy or indirectly by burial of pail contents, it is very desirable that a piped water supply should be provided. If on the other hand it is not possible either to remove the faeces from the plot or to provide a piped water supply, the greatest care should be taken to see that the faeces are so disposed of as not to contaminate the water supply. The pit privy or the site where pail contents are buried, as the case may be, should be situated at the furthest possible point from an underground water supply, and in siting it due regard should be had to the direction of flow of the underground water if this can be ascertained. It is possible to construct a suitable type of pit privy and also pail privies of a satisfactory design at no great cost; space does not permit of a detailed description of what is required, but full particulars can be obtained from this Department. The disposal of refuse and of manure is a matter which can be satisfactorily carried out if sufficient attention is devoted to it. Combustible organic refuse should, whenever possible, be burned to prevent its decomposition; in this way it will be rendered unattractive to flies and rodents. Manure should not be allowed to cause fly breeding and should preferably be treated in a Baber's trap or thoroughly dried by thin spreading in the sun before being dug into the land. The superficial digging of fresh manure into the soil does not, as is popularly supposed, prevent flies from breeding in it.

The obvious conclusion to be drawn from these considerations is that every endeavour should be made to prevent the establishment of further uncontrolled settlements on the outskirts of towns. In so far as townships are concerned this is a matter which is under the control of the Administrators of the various provinces acting on the advice of their respective townships boards. The function of these boards is, among other things, to enquire into the necessity for the establishment of new townships and to see that before approval is recommended for their establishment provision is made for the necessary amenities, including public health services. It is very unfortunate that it is only in the Cape Province that this Department is represented on the townships board, as it must be obvious that direct public health representation is necessary on these important bodies in all the provinces in order to ensure that this aspect of the question receives the attention it deserves. With regard to the question of the necessity or otherwise for the establishment of new townships it is felt that this has an important public health bearing. It is very undesirable that new townships should be established before there is a need for them, unless adequate and satisfactory provision is made for essential services both in the new townships and in the adjacent areas. The expense of providing services in a township which is only partly built up is greatly increased by the scattered distribution of the houses, and from a public health point of view it is therefore unwise to have more townships established than are really necessary in any area.

The subdivision of farms into agricultural holdings is a matter which is also under the control of the Provincial Government authorities. In regard to this it is felt that the greatest care should be exercised to ensure that conditions are not allowed to develop which are detrimental to the public health. Agricultural holdings do not as a rule, except in the Cape Province, fall within the areas of jurisdiction of local authorities and public health control is accordingly largely lacking. It is hoped that the promulgation of the rural sanitary regulations, which are at present under consideration, will assist very materially in the exercise of such control. It is evident, however, that notwithstanding the fact that the legal provisions may be adequate for such control, unless the necessary machinery is available to put these provisions into operation they will remain largely a dead letter. The establishment of local authorities, whether urban or rural, is a matter for the Provincial Administrations. In the Transvaal, Orange Free State and Natal it is very desirable from a public health standpoint that the lead which has been given by the Cape Province should be followed and that rural local authorities should be established, particularly in the areas close to the larger towns. As indicated earlier in this chapter the majority of the rural local authorities in the Cape Province do not function very actively from a public health point of view; but it is those which are adjacent to the larger towns and which contain a somewhat denser population which are naturally most efficient in this respect. In regard to this attention must be drawn to the Divisional Council of the Cape which employs a well organised and properly staffed public health department, including a full-time medical officer of health. If rural local authorities were established in the peri-urban areas of the other provinces they would exercise a beneficial influence in regard to public health conditions.

The establishment of large and uncontrolled Native settlements in the vicinity of towns is a matter which, from the public health standpoint, is of the greatest importance. Notorious examples of such "black belts" are to be found at Edendale, just outside Pietermaritzburg, and at Kliptown, near Johannesburg. Somewhat similar conditions prevail in many other places. The living conditions in these areas are a definite menace to the health of the Natives themselves and the European communities in the vicinity. The hovels in which the Natives are detrimental to their health and are usually grossly overcrowded; sanitary accommodation is either entirely lacking or, if present, is of the most primitive and disgusting type while water supplies are usually drawn from grossly polluted shallow wells or from equally dangerous streams. Under such circumstances it is not surprising that typhoid is common in these areas while those great destroyers of infant life among the Natives, gastro-enteritis and chest diseases are rife in the summer and winter respectively. The morbidity and mortality rates resulting from these diseases in Natives is not known, but it is certain that judged by our European standards they are extremely high. This great waste of human life by preventable disease is deplorable and for obvious humanitarian reasons every endeavour should be made to eliminate the conditions which are responsible. Not only is this necessary in the interests of the Natives, but also of the European. Disease knows no colour bar and it is obvious that where infectious disease is rife in a Native area the danger of spread to a neighbouring European community is very great. There is constant coming and going of Natives between these areas and the neighbouring towns as the wage earners of the Native families are nearly all engaged in the towns. This constant traffic is a means by which infection may be conveyed to the urban communities. The degree of danger

depends very largely upon the nature of the employment of the individual Natives. Where Natives are engaged in domestic work or in the handling of foodstuffs the possibility of their conveying infection is far greater than where they are engaged in industry. In any case the danger is such that, even if looked at purely from the European point of view, improvement in existing conditions is urgently needed.

Owing to the greater numbers involved and to the more primitive conditions which prevail, the Native settlements in peri-urban areas constitute an even more important problem than the European settlements and also one which is more difficult to solve. A very important factor leading to the establishment of these "black belts" is the lack of proper housing accommodation for Natives in the towns. This is a defect which can only be overcome by the establishment of housing schemes by the municipalities concerned, and it is pleasing to note that a more progressive policy has been adopted in regard to Native housing by most municipalities in recent years.

There is provision under the Natives (Urban Areas) Act for preventing the congregation of Natives on land within five miles of a municipal boundary. The distance may, by proclamation, be extended to ten miles in the case of any particular urban area. In actual practice the application of this section of the Act is often found to be a matter of considerable difficulty. Natives who are bona fide in the employ of the owner of the land and their dependents are exempted from this provision and it is therefore sometimes claimed that a Native family is legally entitled to reside on a farm because one member works for the farmer during a part of the year. Where Natives are settled on a farm, even in considerable numbers, the difficulty of proving that they are squatting and not bona fide domestic servants appears to be very great, and for this reason the Native Affairs Department and the police are not always able to prevent the development of Native communities living under uncontrolled conditions in the vicinity of towns. There are certain other classes of Natives who are exempted from the provisions of this section of the Act. Perhaps the most important groups so exempted are those who are registered owners of land within the area, and those living in a reserve lawfully established prior to the commencement of the Act. Although the justice of these provisions for exemption cannot be gainsaid it is under these last two clauses that some of our worst "black belts" are established and allowed to continue. It is obvious that the whole problem is fraught with administrative difficulties.

The Department's general policy in regard to peri-urban settlements, whether of Europeans or Natives, is usually to advise their incorporation into the neighbouring local authority. It is clear that in practically all cases these settlements are inhabited by people who are directly dependent on the adjacent towns both for employment and for such general amenities as they enjoy. It is therefore not unreasonable to expect that the municipalities which benefit financially from the presence of such settlements, and whose health is at the same time menaced, should take an active interest in the welfare of these communities. The establishment of a number of small local authorities which, of necessity, would be financially weak would be very unsound from a public health standpoint, as such local authorities would not be able to provide the necessary amenities, particularly under the scattered conditions obtaining in peri-urban areas. For this reason incorporation into large and financially strong municipalities is generally favoured as a more satisfactory solution. The municipalities concerned are often averse to incurring additional liabilities in respect of their peri-urban areas, but if the long view is taken it is obvious that the Department's policy is not only sound from a public health viewpoint, but that it is also in accordance with the logical process of development of the larger municipalities.

A committee, under the chairmanship of Sir Edward Thornton, is investigating the question of these areas which are becoming urbanised. The problems before this committee are of great complexity and magnitude. It is anticipated that some very helpful suggestions will be put forward and the committee's report is therefore awaited with great interest.

8.—DISPOSAL OF WASTE MATTERS.

General.

The disposal of waste products of human activity—excreta, household refuse, slopwaters, factory wastes—by methods which satisfy both the aesthetic sense and the canons of public health may fairly be regarded as a mark of a civilised community. Judged by this standard there are, it must be admitted, very few fully civilised communities in South Africa. Our public buildings, many of our private houses, our roads and our railways, our electricity schemes and our broadcasting stations are expressive of our advance in those manifestations of material culture, but the standards of sanitation which pass muster in most parts of the country lag a long way

behind. The explanation so often invoked, that the situation is due to the presence of the uncivilised Native in our midst, is no excuse for it but rather the very reason why much greater efforts should be made to improve the situation. Great numbers of Natives have become urbanised during recent years. They are segregated into locations; but, however distinct the locations may be socially and administratively, from the economic and public health viewpoints they are an integral part of the whole community. Neglect of sanitation in the locations may in the first instance be detrimental to the health of the location residents only, but in the long run it is bound to affect adversely all sections of the community. The persistence of insanitary conditions in locations—such conditions as exist in some highly prosperous as well as in less affluent towns of the Union to-day—is a blot upon the civilisation of South Africa, and is to be regarded with uneasiness as a potential menace to the health of European and Native alike.

On farms and in villages and small towns where Natives live on premises directly controlled by their employers, it is only occasionally that the Europeans themselves set a very high standard or provide their employees with adequate washing facilities and hygienic latrine accommodation. It is not yet sufficiently realised either by individual citizens or by local authorities, that one insanitary spot may become the starting point of an epidemic or—as is more often the case—is like a festering sore, producing a trickle of cases of typhoid or some other dirt disease. In a country like South Africa, which is too vast to be covered completely by the inspections of trained health officials, a special responsibility rests upon the individual householder to establish and maintain proper hygienic standards within his own domain. To fail in this is surely to fail in a duty of citizenship, for the penalty of neglect may be paid by a man's neighbours as well as by those of his own household.

Disposal of Excreta.

During the year several towns have installed or extended water-borne sewerage schemes, or have submitted proposals to that end. The development of this, the most satisfactory method of sewage disposal is hindered in South Africa by the difficulty of securing adequate water supplies throughout the year. For this reason, alternative methods require constant investigation and careful control. Attention has recently again been focussed upon a serious direct economic loss due to unhygienic conservancy methods. In many parts of the Union the pollution of the open veld with human faeces containing tapeworm eggs results in infestation of cattle and pigs with cysticerci or "measles". The carcasses of such animals are liable to be condemned altogether, or to be detained in cold storage, when slaughtered for human consumption. Losses from this source have become so serious that a conference to consider their prevention was held recently under the aegis of this Department. It was attended by representatives of the various farming and administrative interests concerned with this problem. From the discussion there soon emerged a realisation of the fact that little diminution of these losses can be expected unless and until this department can carry out its designs for improved sanitation of the Native and farming areas through a programme of health education and preventive medical services.

During the past eighteen months a large scale experiment with an improved type of pit privy has been carried out at Grahamstown, the results of which indicate that, provided the privies are built in strict accordance with the requirements and specifications of the Department, this method of disposal of excreta is hygienically effective as well as economical. There are two absolute contra-indications to this system: ground which is, or is liable to become waterlogged, and proximity of underground water supplies. It should also be clearly understood that a single pit privy is intended to serve one household and not several, otherwise it becomes overloaded and fails to function satisfactorily. A well constructed pit privy is undoubtedly superior, from the point of view of checking odour, fouling, and fly breeding, to any type of pail privy. The greater cost of construction is offset by the fact that removal services and depositing sites are not required.

The disposal of night-soil in the majority of urban locations continues to be highly unsatisfactory. Few local authorities seem able to escape from the delusion that the total number of pails required for the receipt of the excreta of a given population is less if the pails are placed in communal latrines than if they are placed in individual household privies. In consequence it is rare to find, in a location under the communal system, a pail provision on a more generous scale than one pail for thirty persons. Locations are known where there is only one pail for over 100 people. The minimum requirement, even on a nightly removal basis, is one pail per 16 or 20 persons. By the inexorable law of the non-compressibility of solids and liquids, insufficient provision can have only one result—the overflow of pail contents on to floors and seats, and the use, by those Natives who are revolted by this spectacle, of any convenient cover they can find in the vicinity: fences, hedges, trees, dongas, river-beds, and even the open streets

so ill-lit in many locations. This logical inference is amply confirmed by actual inspection of the closets themselves and of the vicinity of any location which is provided with communal closets. It is well within the truth to state that in the majority of the smaller towns of the Union where there is a Native location, more than 50 per cent. of the faecal output of the inhabitants is deposited on the surface of the soil in the near vicinity, and usually within a mile or two of the European part of the town—that is to say, well within the range of flight of flies.

On the other hand, it is found that in locations where household closets are provided the latter are almost invariably kept in a cleanly condition; and if they are not, responsibility can be fixed in a way which is impossible under the communal system. It is unfair and unreasonable to lay the blame for the insanitation of locations upon the Natives themselves, when latrine accommodation is fundamentally inadequate. A further disadvantage of the communal system is that at night, in wet weather, and in the case of the young and the infirm, there is a tendency to make use of cover close to the house instead of going to the distant closet. Stercus is thus deposited within the location as well as on its outskirts.

Throughout the world the standards of civilisation demand that each household should have its own privy. The replacement of the communal closet system should therefore be the aim of every local authority desirous of bringing sanitation within its area into conformity with those standards. In some cases a programme designed to achieve that end will have to include provision for the rehousing of Natives on larger plots than they now occupy.

It is pleasing to report that the Railway Health Administration has made considerable progress during the year in respect of the sanitation of rural railway properties. At small railway stations the Administration is advancing its policy of replacing the shallow trench method of disposal of stercus by the closed Otway Pit. During the year 104 such pits were installed, bringing the total to 146, as against 947 stations where the shallow trench method is still in operation. All these stations are serviced by sanitary porters in the employ of the Administration, so that removals are carried out with proper precautions. At more isolated points, where sanitary porters cannot visit regularly, pit closets have been established, to the number of 180 to date. Pit closets are also provided at the model villages which accommodate the European workers on the large-scale alterations to the East London main line. Septic tanks are finding favour at stations where an adequate water supply is available; and at the permanent railway villages at Waterval Boven and at Touws River complete water-borne sewerage schemes are projected.

Domestic Refuse.

Even in some large towns of the Union the methods used for the collection and final disposal of refuse are unhygienic and obsolete. In many of the smaller towns and villages removal services are either non-existent or very inadequate. Particularly is this true of Native locations. Open collections of refuse in varying stages of decomposition occur all too frequently. In addition to the unsightliness of such collections, and the menace from fly breeding therein they attract and harbour rodents, the danger of which in plague-infected areas scarcely requires emphasis. The standards to be aimed at with regard to the hygienic disposal of refuse are a metal receptacle, with tight fitting lid, for each household in the community, an adequate removal service, and an efficient method of final disposal. Incineration, controlled tipping, or deep burial are all satisfactory, with the proviso that in the case of the first two careful supervision is required.

The labour camps established by the Railway Administration are usually provided with portable incinerators for the destruction of refuse. These are cheap to construct, and it would undoubtedly represent a considerable advance if all labour camps and road parties were to be similarly equipped.

The "Indore Method" of Sir Albert Howard, which is an application of composting to the disposal of combined domestic and garden refuse and sewage, has been tried out at Clanwilliam by Dr. le Fras Nortier. The methods he has employed and the results achieved are recorded in a paper by him in the South African Medical Journal of November 26th, 1938. From this it would appear that the Indore method could be used with advantage by small local authorities in South Africa, and it is hoped that they will not hesitate to carry out experiments similar to those undertaken at Clanwilliam. The principal requisite for success is the employment of attendants who will faithfully and intelligently carry out the necessary technique.

Slopwater.

In villages, towns, and locations without sewerage, the inefficient disposal of slopwater often leads to undesirable conditions. In malarious areas there may result no small danger to the public health from the breeding of mosquitoes in puddles caused by surface disposal.

In many towns slopwater is stored on premises and removed periodically by municipal carts. Storage is usually inadequate and removals insufficiently frequent, so that this system is generally unsatisfactory. The best method other than sewerage is undoubtedly disposal by means of french drains, well constructed and of sufficient length. In soils lacking in absorptive capacity the difficulty may be overcome not only, as has just been suggested, by the building of drains of greater length, but also, as has been demonstrated by the Railway Health Administration during the past year, by the planting of trees in the vicinity. This Administration has been responsible for the new construction of some 600 french drains and the planting of 8,000 trees in association therewith. In the latter connection the Railway health officer has made the suggestion that nurseries should adopt a policy of budding some well-known and popular fruit stocks for use in french drainage absorption.

Dairy Wastes.

At several large creameries nuisance has arisen through the offensive nitrogenous decomposition of surplus skim milk run to waste on the surface of the veld. It is common practice to establish piggeries in association with creameries, the pigs being fed with the skim milk. At the creameries where nuisance has arisen there is not a continuous supply of skim milk, owing to the fact that separation is only undertaken at intervals of two or three days. Under such circumstances the keeping of pigs is not practicable. Nor can the skim milk be run into french drains, which would soon cease to function effectively owing to a fatty film clogging their action. It has been suggested by the Department that a by-product of such potential value from the standpoint of nutrition should not be allowed to run to waste and become a nuisance, but that it should be converted into dried skimmed milk, the value of which is well recognised by nutrition experts. Whether this suggestion is practicable from the manufacturing standpoint is at present under consideration. It certainly would appear anomalous that in a country notoriously deficient in the production of milk and milk foods, milk in any form should become a public nuisance instead of an asset for public health. In this problem we have an example of the potential value of a Council of Nutrition for the co-ordinating of all activities connected with the production of food.

9.—“ KOSHUISE ” IN THE CAPE PROVINCE.

Systematic general inspections in the north-western districts of the Cape Province first brought to light the very unsatisfactory conditions which exist in many of the school hostels for indigent children. The hostels are in most instances owned and controlled by Church organisations.

During the latter half of the health year “ Koshuise ” were inspected in 15 towns situated in the Karroo, the north-western Cape and along the west coast. In these towns 659 boys and 597 girls, a total of 1,256 indigent school children were accommodated in institutions of this nature. In some cases boys and girls were housed in separate buildings, but in most instances separate wings of the same building were set aside for the sexes.

Most of the buildings were never designed for hostel purposes and in several cases were actually private residences or school buildings adapted for their present use. They have been poorly maintained, and with few exceptions these buildings are in need of extensive general repair and redecoration.

The dining-rooms might on the whole have been regarded as reasonably satisfactory had their use been confined to their one purpose; but as they also function as study rooms, the inadequate lighting which exists in so many cases, must receive unfavourable comment. In one place seen, dormitories opened directly from the dining-room, an arrangement which must be condemned as most unhygienic.

The general tendency is for kitchens to be too small and too poorly furnished. They are with few exceptions not fly-screened, while absorbent white-washed wall surfaces and unprotected wooden floors are by no means uncommon. Scullery and washing facilities are frequently primitive and unsatisfactory. Drain boards of deal or even boxwood, without proper flushing were seen in several kitchens, and there are also kitchens without a water supply laid on. These may not be serious inconveniences in a private dwelling, but will certainly militate against kitchen hygiene in institutions which cater for large numbers.

Pantry accommodation and other facilities for food storage are generally inadequate, and in many cases the food is not properly protected against contamination. This is particularly the case at those institutions where slaughtering is done on the premises and meat has to be kept over for several days.

With the exception of one institution where the daily ration per child had been carefully worked out and weight records of the children were regularly kept, little information could be obtained about ration scales. The impression gained is that diets depend entirely upon the current market prices and that the inclusion of protective foods is by no means a primary consideration.

In the majority of cases dormitories are overcrowded. Beds are frequently less than eighteen inches apart and in one "Koshuis" which housed 110 boys and 90 girls, there were so many beds in some of the dormitories that the floor was hardly visible. Light and ventilation are often inadequate and cases can be cited of dormitories built on the back-to-back principle and another where the only windows opened into the dining-room.

At one of the institutions inspected, boys of all ages are accommodated in dilapidated out-buildings, in which broken doors and windows have been replaced by sheets of corrugated iron. Bug-infested wooden bedsteads furnished one of the dormitories seen, and for that matter bug-infestation in certain areas was the rule rather than the exception.

Broken wall plaster and unsuitable wall finishes undoubtedly encourage vermin infestation; but a good deal also depends upon the supervisor of the institution. This was proved by the absence of bugs in an unplastered brick-lined bungalow used as a dormitory. This institution is, however, fortunate in possessing an energetic house-mother and a sympathetic local committee, and is the same one previously referred to, where a balanced diet is maintained. Overcrowding, insufficient light and ventilation and vermin infestation are, in terms of the Public Health Act, all regarded as nuisances which may be injurious or dangerous to health, yet we find one or other or all of these conditions existing in the majority of "Koshuise".

Ablution facilities are if anything worse than the sleeping accommodation and we find that on an average there is only one shower and one bath for every 30 children and one wash-basin for every twelve children. These figures, although in themselves unsatisfactory, become much more impressive if regard is had to the primitive nature of the facilities provided.

In several of the institutions the baths are actually large concrete sumps which cannot be properly cleaned and disinfected and may thus be the means of spreading vulvo-vaginitis and other infectious conditions. A hot water supply is frequently not available, even in districts where the winters are severe. In at least one instance, where there is only one bath for the 47 boys, all the water has to be carried in buckets from an outside source, as the water supply has not been extended to the bathroom.

Wash basins are more often than not of the jug and basin variety, which become very inadequate when they have to serve a large number of children. Cleanliness must indeed be at a premium when only two such basins are available for anything up to 50 children.

One bath, three showers and two wash basins for 96 children of both sexes; three baths, five showers and six wash basins for 150 children; two baths and four basins for 94 children are only a few instances of insufficient ablution facilities. Probably the worst example that can be quoted is a hostel which happens to be under the direct charge of the principal of the local school who resides on the premises. At this hostel one bath and two hand-basins, with no water supply to the bathroom, must serve 110 boys; while there are actually no bathing facilities for the 90 girls.

The closet accommodation is invariably of unsatisfactory design and construction and frequently insufficient. In some places pit latrines are in close proximity to bore-holes and wells from which the water supply is obtained, thus exposing the supply to pollution. Such risks to the health of the children may at any time precipitate a disastrous epidemic and in most of the hostels seen, the spread of infection will be further encouraged by the absence of sick-rooms.

With few exceptions the "Koshuise" inspected have left an extremely unhappy impression on the visitor and only a Dickens could adequately picture the conditions which exist in some of these institutions. Every possible effort should be made to improve the existing state of affairs, and as most of the supervisors and committees of control are obviously not acquainted with the standards of hygiene which should be maintained, these should as far as possible be unequivocally fixed.

Diet scales should not only be laid down, but steps should be taken to ensure that these unfortunate children receive at least the minimum required amount of protective foodstuffs. The one institution, where weight records of all children are kept, could well serve as an example for all others.

10.—HEALTH CONDITIONS IN THE TRANSKEIAN TERRITORIES.

The Transkei comprises an area of 16,554 square miles, extending from the Kei River on the south, the Indian Ocean on the east, to the borders of Natal and the Drakensberg Range. Many parts of it are inaccessible by ordinary transport, particularly those nearest to the coast, so that medical services are not easily available. While malnutrition accompanied by poverty, disease, lack of sanitation and indifferent housing, are still apparent, much is being done to render the Native once again the fit person he used to be 20 to 30 years ago.

Such factors as witchcraft, superstition, the ministrations of herbalists, tribal laws, long distances from medical aid and ignorance make it very difficult to provide adequate health services. In 1929 a health officer was appointed with headquarters at Kingwilliamstown to serve the Ciskei and Transkei. In 1931 the service was discontinued and once again matters were left very much as before. In 1938 a medical inspector was appointed to the Territories, stationed at Umtata.

The Native population of the Transkei, according to the 1936 census, was 1,154,378 of which 19,356 live in urban areas. During the year 1938 a total of 87,064 Natives was recruited for the mines, during the same year 190 Natives were repatriated suffering from tuberculosis. In the absence of registration of births and deaths no reliable information can be obtained in connection with mortality and morbidity rates. The spasmodic and fitful notification of infectious diseases renders returns of these conditions also useless.

The country is overstocked with very inferior cattle; the milk yield is as a result small and poor. As the cattle are not slaughtered as a source of food they are lost to the Natives. The Native diet consists largely of starch; usually mealie meal porridge in the morning and boiled stamp mealies in the evening. Consequently he lacks the protective foods. Native children are usually breast fed until they develop a mouth full of teeth. In addition all and sundry drink kaffir beer. A nutritional survey was carried out in the districts of Qumbu and Kentani early in 1939.

The average Native hut is poorly constructed of wattle and daub, daaga or stone, thatched, poorly ventilated, usually damp, dirty and rodent infested. Certain parts of the Territories are very densely populated, e.g. Qamata Poort in the Cofimvaba district.

There is a monotonous sameness in health conditions prevalent in the Transkei. The average small town or village is situated in the middle of a large Native reserve, with no farming community and hence no primary produce; the municipality or board is usually in dire financial straits or vested interests prevent an increase in the rates, thus holding up any form of development. In the majority of cases rain-water storage tanks are the only water supplies. In others there may be a poorly constructed catchment reservoir with obvious sources of pollution. Water purification is seldom in existence. European dwellings are mostly poorly constructed of burnt brick. The Native urban population reside in wattle and daub structures or tin shanties, usually scattered without design amongst the Europeans. Many of these Native huts are owned by Europeans; they are usually unfit for habitation and grossly overcrowded. The rodent position is a serious one. There are very few villages which are not rodent infested, and no effort is being made by the residents to demolish such harbourages. Cows are privately owned, privately milked and privately housed, generally in a dirty cowshed or kraal in the village. Dairies are usually hygienically unsatisfactory. Bakeries are equally unsatisfactory. Fortunately most people do their own baking. With the exception of a few villages the old-fashioned slaughter pole is still in vogue; moreover, it is privately owned and dirty. Humane killing is gradually being resorted to. No system of meat inspection is in existence. An effort was made last year to interest boards in this matter, but with indifferent response. Kraals are numerous in every small town. An earnest effort is being made to induce councils to remove these to the commonages outside the town. No serious attempt is made to combat fly breeding. Sanitation is primitive except in the larger towns, which have water-borne sewerage. Most of the villages have pit privies or single pails. The dual pail system is rare. The night soil disposal is always difficult and requires constant supervision and instruction.

Medical services may be divided into:—

(a) Hospitals:

5 Provincial Hospitals—Number of beds: 451.

10 Mission Hospitals—800 beds approximately.

2 Leper Hospitals.

(b) Clinics attached to Missions: 2 (Native nurse in attendance).

(c) Rural Clinics: 4 in Umtata district alone.

(d) Venereal Disease Clinics: 2.

A child welfare clinic is conducted in the Umtata Location.

It is anticipated that during 1939 twenty rural dispensaries will be established in 20 of the 27 magisterial districts of the Transkei. In view of the success of the clinics already in existence in the Umtata district there is no reason why the new clinics at suitable outposts will not be an unequalled success. In addition, a full-time medical officer will be stationed in one Native area in charge of a central clinic, and 5 or 6 rural dispensaries at points some distance from headquarters. At each of these dispensaries there will be a Native nurse and it will be regularly visited by the medical officer. This service wherever placed will serve as additional medical service to that of the district surgeon and it will in no way interfere with the latter's duties. The service will emphasise the preventive aspects of medicine, dealing with venereal disease, tuberculosis, typhus, plague and its preventative measures—in addition to health propaganda work.

There are 60 medical practitioners in the Transkeian Territories, distributed as follows:—

Medical Inspector (full-time)	1
District Surgeons (part-time)	27
General Practitioners	21
Mission Doctors attached to Hospitals	9
Residents in Provincial Hospital	2

The general practitioners include two Native and one Coloured.

Four typhus inspectors are employed by the Department. In time these men will be trained to deal with plague, malaria and smallpox, and to do propaganda work when not otherwise engaged.

Health education is unsatisfactory, the subject not being presented sufficiently attractively to the Native children on account of the indifference of the average Native teacher. A scheme for imparting health instruction in schools was outlined by the Medical Inspector to a Native Teachers' Congress at Idutywa. Provincial Education is providing valuable co-operation and assistance by means of the following schemes:—

1. The Nyanga Farm School at All Saints Mission, Engcobo district.
2. Milk supply to schools in the Butterworth district.
3. Training of Jeanne's Teachers at All Saints.
4. Health and nutrition meetings at Teko Agricultural School.

In addition health propaganda is carried on by means of popular articles in the Native Journal "Umcebisi". There are three agricultural schools in the Territories, at Tsolo, Flagstaff and Butterworth, from which Native agricultural demonstrators are sent into the reserves.

Through the good offices of the United Transkeian Territories General Council and the help of a substantial grant by the Native Trust, provision is being made for more and better water supplies. During the year ending June, 1939, the following were effected:—

1. Clean water reservoir and fencing	289
2. Fencing only	29
3. Dams built	38

The training of Native nurses remains a problem on account of the low mental standard of the Native, the difficulty in teaching through the medium of English and the lack of teaching facilities. The Holy Cross Hospital is the only training school where Native nurses are produced with any degree of success. It is gratifying to note, however, that at Umtata (Sir Henry Elliot Hospital) and certain mission hospitals, fully qualified nurses are being turned out. There already exists a great demand for such Native girls, which will be increased by the future demands for the staffing of rural dispensaries, clinics and child welfare centres.

11.—RAILWAY MODEL VILLAGES.

A task unprecedented in its history confronted the Railway Administration during the year. On completion of the Natal main line improvements, the two model villages, their occupants and belongings were transferred to the Cape Eastern System for the commencement of further extensive works on the main line. Families were transferred in batches of about 50 on special trains over a period of approximately 9 months without a hitch and with a minimum of inconvenience to the men, women and children. This was a very creditable performance on the part of the construction engineers and others of the staff concerned, especially in view of the concurrent transfer of the housing.

Prior to the transfer, the resident engineer and Dr. Booker visited the Cape Eastern System to collaborate in selecting suitable sites for the new villages and to make arrangements concerning water supplies, sanitation, layout of the villages, medical and other essential services.

The village at Ingogo, which consisted of 200 houses, was dismantled on completion of construction work in September, 1938, and the dismantling of the village at Mount Prospect, which consisted of 250 houses, was completed by the end of February, 1939. "Vooruitgang", situated at Dohne station, consisting of 235 pieceworkers' quarters, was the first of the two new villages to be erected. It was commenced in July, 1938, and completed in April, 1939. The transfer of inhabitants commenced at the end of August and the village was fully occupied by the end of November, 1938. The second village, "Rusgenot", consisting of 215 pieceworkers' quarters, was established about two miles from Toise River station. Construction was commenced in October, 1938, and completed in June, 1939. The first families were transferred in December, 1938, and the village was completely occupied by the end of April, 1939.

Advantage was taken on the transfer of the villages to effect several important structural alterations to the houses. These may be summarised as follows:—

1. Kitchens and bathrooms, which originally were situated in the front portion of the houses have now been placed at the rear and small front verandahs have been added.
2. Bathrooms were provided in 100 out of 450 houses in Natal. The other 350 houses, previously relying upon communal facilities, have now been provided with bathrooms. A porcelain bath was installed in each house.
3. Communal bathrooms, which existed in Natal, have been abolished, but wash-houses for the washing of clothes have been retained.
4. Some of the houses in Natal were not provided with communicating doors between bedrooms which necessitated access to some rooms *via* the verandah. Internal access has now been provided to all bedrooms.
5. Sinks have been fitted in all kitchens with a water tap to each sink.
6. Garden taps have been provided at all houses.
7. Certain houses in Natal were constructed with asphalt floors. All houses have now been provided with wooden floors.

Of the 450 workers' quarters in the new villages, 361 are occupied by railworkers, of whom about 331 are employed on piecework and 30 at daily rates of pay. The remaining 89 are occupied by casual graded staff. Three hundred and fifty-six families were transferred from the villages in Natal, 86 from construction works at Glencoe and 8 were obtained through the Department of Labour.

The population of the villages as at 31st May, 1939, was as follows:—

Village.	Men.	Women.	Children.	Total.
Vooruitgang.....	234	234	633	1,101
Rusgenot.....	216	214	605	1,035
TOTAL.....	450	448	1,238	2,136

The pit latrine system has been adopted throughout Vooruitgang and Rusgenot and has proved satisfactory. There is no pollution of water supplies and adequate precautions were taken against fly breeding. To prevent nuisance from odours, the pits were sprinkled bi-weekly with chloride of lime. Suitable refuse bins with tight fitting lids were supplied to each dwelling. Household refuse was collected two to three times per week and disposed of in refuse pits and each day's deposit burnt and covered with earth to prevent fly breeding. Street and garden refuse was cleared once per week. Liquid wastes were disposed of by means of french drainage.

The Vooruitgang water supply is obtained by pipe-line from the Stutterheim municipal reservoir, situated about 3 miles from the village in a valley on the slopes of the Amatola mountain range and fed from surface water and springs. The catchment area is adequately protected and the water is chlorinated by the suppliers. The Rusgenot supply is drawn from an adjacent stream and chlorinated departmentally before distribution to the village. Monthly samples from both supplies for bacteriological

examination gave consistently good results. The daily consumption of the former village ranged between 15,000 and 20,000 gallons and the latter averaged 11,000.

Experience with European labour since it replaced Native labour on certain railway construction works has proved that under suitable conditions the former can be more economical and satisfactory. Experience has also taught that satisfactory labour cannot be assured in the absence of satisfactory housing and social conditions. The model village system has brought with it many advantages, which, although difficult to assess on a cash basis, have gone a long way towards solving the construction engineer's labour difficulties. The advantages to the Railway Administration may be summarised as follows:—

- (a) More regular working.
- (b) Less drunkenness.
- (c) Better discipline, as men in the villages are usually loth to run the risk of being turned out.
- (d) Less labour wastage. Wastages in Natal were approximately 2 per cent. per month as against a normal 20 per cent. to 30 per cent. in respect of men not resident in the villages. This reduced recruiting costs and costs of sending men to and from work. It is anticipated that labour wastage on the Cape Eastern main line improvements will be reduced well below 2 per cent.
- (e) More reliability and efficiency resulting from the first four benefits.

Taking into consideration these advantages, together with the various amenities enjoyed by the model villagers—the better medical attention to the workers and their families; good and regular schooling; regular religious services; facilities for recreation; improved nutrition; opportunities for social advancement, with consequent dispelling of the inferiority complex, the creation of confidence and ambition and generally the laying of the foundations for more useful citizenship, both present and future, there is no gainsaying that the scheme has been well worth while.

• III.—INFECTIOUS AND PREVENTABLE DISEASES.

12.—BILHARZIASIS OR SCHISTOSOMIASIS.

The general arrangements for dealing with this disease continue as in previous years.

The Transvaal Bilharzia Committee has remained as the controlling organisation in the northern province. It has extended its work of securing the erection of shower and swimming baths at various schools. Useful work recently done has been the treatment of Native groups in such districts as Louis Trichardt, Nylstroom and Nelspruit. This campaign has been extremely useful both as a curative and educational measure. The Committee, desiring to bring more communities within reach of modern treatment, has recommended the creation of a mobile unit. This would consist of an equipped van carrying the services of a medical officer and nurse into all bilharzial regions. The proposal is at present being considered by the various bodies interested.

At a recent meeting of the Committee an important resolution was passed which read as follows:—

“In view of the seriousness of bilharziasis in the Native communities, and especially the Native Territories, constituting a danger both to the Native and European population, the Transvaal Bilharzia Committee considers it of extreme importance that a satisfactory Native health and medical service shall be established as soon as possible”.

The Committee feeling that much treatment was inefficient has circulated the following information:—

“The Transvaal Bilharzia Committee has found that in treating cases of bilharzia, the following are very important points for ensuring that all patients treated shall have been properly cured, and that the two drugs most commonly used, Fouadin and Sodium Antimony Tartrate, shall not fall into disrepute in the eyes of the public.

1. A regular course of injections is very important; a minimum of three injections per week is essential, and the missing by a patient of even one of these injections retards the whole cure very perceptibly.
2. Without accurate and regular microscopic control of results, it is really not worth a doctor's while to undertake the treatment of a case. In spite of the number of injections

usually accepted as sufficient, it is necessary that after the ninth injection the patient shall continue until at least three successive examinations of centrifuged urine are absolutely negative both with regard to red blood-corpuscles and bilharzia ova. This is the only way to ensure against a relapse. The only possible exception to the above might be a case of chronic cystitis, where ova have long since disappeared from the urine, and where treatment must be directed not to the bilharziasis itself but to pathological conditions which have resulted from it.

3. The re-examination of cases treated after one or two months is a very useful control for distinguishing between relapse and reinfection."

Further survey work in the Transvaal was undertaken. In Table 8 are shown the results obtained in Native schools in the Sibasa region east of Louis Trichardt:—

TABLE 8.—BILHARZIA SURVEY, SIBASA AREA, AUGUST, 1938.

AREA (Sibasa District).	CHILDREN EXAMINED.								
	MALES.			FEMALES.			TOTAL.		
	Tests.	Posi- tive.	Per- cen- tage.	Tests.	Posi- tive.	Per- cen- tage.	Tests.	Posi- tive.	Per- cen- tage.
N.E. (6 schools).....	251	146	58.2	67	40	59.7	318	186	58.8
West (3 schools).....	148	36	24.3	65	15	23.1	213	51	23.7
Sibasa Camp (3 schools).....	226	104	46.0	73	11	15.1	299	115	38.5
Tshakoma (2 schools).....	279	72	25.8	174	47	27.0	453	119	26.3
Valdecia (2 schools).....	176	78	44.3	118	41	34.7	294	119	40.5
TOTALS.....	1,080	436	40.0	497	154	30.9	1,577	590	37.4

In Natal the various surveys of non-European health conditions being undertaken by the Department have incidentally given data concerning the incidence of schistosomiasis. Over 4,000 Natives school children were examined in the Natal coastal area from the Umkomaas Valley in the south to the Tugela Valley in the north. In this group 470 children were examined in detail because of a history of haematuria. The urine in 99 per cent. of these showed *S. haematobium*. Two cases of intestinal schistosomiasis were also discovered.

13.—ENTERIC FEVER.

Enteric fever occurred over a wide area in the Cape Western Province. In the Malmesbury Divisional Council area 21 European and 99 non-European cases were reported during the year. Cases were notified there during every month of the year, with a steadily rising incidence during December, January and February, a very marked increase in March and April and reaching a peak in May with a sudden drop in June. This indicates the existence of widespread endemic enteric infection. Reference may be made to some of the more severe outbreaks in the Cape Province.

A small outbreak, traced to polluted furrow water which was used for domestic purposes, occurred at Halfmanshof in the Divisional Council area of Piquetberg. On the 14th November, 1938, the Secretary of the Divisional Council, Piquetberg, informed the Deputy Chief Health Officer, Capetown, that notifications of thirteen cases of enteric fever had been received among persons living at Halfmanshof near Porterville. The persons affected were Coloured people living on farms through which an irrigation furrow runs. An investigation was immediately carried out by an officer of this Department. The furrow starts from a stream at Dasbos. After passing through various farms it enters the Berg River. On every farm which the furrow traverses cases of enteric fever occurred. No system of sanitation exists in this area. Samples of water examined by the Government Pathologist showed that gross pollution, rendering the water unfit for domestic purposes, existed at the Kloof above Dasbos, at the furrow at the farm Die Tuin and on the farm Die Tuin. Owing to the severity of the outbreak it was necessary to open a temporary hospital in an old barn. This hospital opened on the

28th November, 1938, and closed on the 15th February, 1939. Altogether 50 patients were treated in this hospital, of whom 2 died. On the 19th December there were 41 patients in hospital and 3 nurses were employed. The last 5 patients were discharged on 15th February, 1939. Very strict supervision was exercised over the furrow and prophylactic measures were applied to contacts. Among the European farmers there were 15 cases of enteric and 1 patient died. Most of these people employed private nurses and 1 nurse contracted enteric fever. The cause of the outbreak was probably a carrier and the epidemic was caused by the lack of sanitation and the fact that the furrow water is used for domestic purposes.

Most water supplies in the Western Cape area are very unsatisfactory and many of the people have no option but to drink polluted water. With the almost total lack of even the most primitive sanitation and with water supplies open to gross pollution, it is not surprising that enteric fever is endemic in many parts of the Western Province. The epidemic at Halfmanshof, a rural area, is typical of several other outbreaks which have occurred in the past. In more thickly populated areas conditions are often just as bad. As for instance, at Saron, a mission settlement in the area of the Divisional Council of Tulbagh. This village has a population of some 2,250 Coloured people of whom 400 are children of school-going age. All powers of local administration are vested in the resident European missionary. Sanitation is left to the inhabitants, each householder making his own arrangements. The water supply is from open irrigation furrows into which slop water and other refuse is emptied. Enteric fever, as is to be expected, is endemic. The following cases of infectious diseases have been notified in this area during the period 1st January, 1938, to 9th December, 1938:—

Period.	Enteric Fever.	Tuberculosis.	Other.
1st Quarter.....	2	1 (died)	—
2nd Quarter.....	2	2 (1 died)	—
3rd Quarter.....	1	4 (all died)	1 (Puerperal Fever)
4th Quarter (to 9/12/38).....	17 (2 died)	4	—
TOTAL.....	22	11	1

Of the 17 cases in the 4th quarter, 14 were children between the ages of 5 and 12 years. This is typical of these outbreaks of enteric fever. The vast majority of those affected are young children, probably because the adults have already had the disease in their childhood.

In last year's annual report attention was drawn to the danger of the pollution of the Berg River. Very strict supervision has been exercised over this area and persons have been warned against bathing in the river. During the year 12 cases of enteric fever occurred in the Divisional Council area of Paarl—3 Europeans and 9 non-Europeans. The cases were sporadic and indicate that the danger still exists. In the municipal area of Paarl there were only 3 cases (all in Coloured people) during the year. An improvement should follow the transfer of control of Pniel to the Paarl Divisional Council for a period of five years.

Samples of water from the Berg River on bacteriological examination showed evidence of pollution. Nevertheless conditions were better in February, 1939, than in February, 1938, showing that control was more efficient in 1939. There must, however, be no diminution in the strictness of sanitary control in this area.

Outbreaks occurred in several municipal areas, the two most severe being at Hanover and Uitenhage. At Hanover enteric fever has occurred annually for many years; but during the years 1935-1938 only 2 cases were notified. Early in February, 1939, an outbreak commenced when a non-European child aged 8 years was notified as suffering from enteric fever. From then onwards cases occurred in small numbers. Up to the end of July 42 cases had been notified. The outbreak was investigated by an Assistant Health Officer of this Department; but the cause of the outbreak was not definitely ascertained. It certainly was not water-borne. It is probable that the first cases were infected from a carrier; once the disease had occurred, its spread was facilitated by general insanitary conditions especially in the locations where the majority of the cases occurred. A temporary hospital was opened and the municipal authorities took steps to combat the outbreak.

During the year 10 European and 45 non-European cases were notified from the municipal area of Uitenhage and 3 European and 22 non-European cases from the Divisional Council of Uitenhage. The most serious outbreak seems to have commenced early in February, 1939, when 2 cases occurred in one hut in Gubb's Location and subsequently 23 other cases occurred in the same location. In several instances more than one case occurred in a hut; as many as five cases occurring in hut No. 3. One of the patients in Gubb's Location had a Para-typhoid A infection—the others were due

to the *Bacillus typhosus*. Sanitation in the location is undoubtedly extremely bad. The Municipal Council took all necessary steps, including hospitalisation of cases, to deal with the outbreak. Cases of enteric had occurred among Europeans on dairy farms outside the municipal area, but as the affected persons were promptly isolated the danger of spread from these sources was checked.

In Natal enteric fever headed the list of preventable diseases. Most of the cases occurred sporadically; but there were two major outbreaks, namely, that in the Helpmekaar district where 20 cases occurred, and that in the Umzinto district where 8 cases occurred.

In the Free State and the Transvaal this disease is still unnecessarily prevalent. Tables 9 and 10 indicate the numbers of cases in the provinces as a whole and in the chief local authority areas of each province. The remarks made last year of the decline of this disease on the Witwatersrand remain true, and are a most satisfactory index of the successful work now being accomplished by its local authorities. The full-time medical officers of health have thus given direct evidence of the substantial benefits they are conferring on their communities in the campaign they are waging against insanitation.

TABLE 9.—ENTERIC OR TYPHOID FEVER: DISTRIBUTION OF CASES REPORTED DURING THE YEAR ENDED 30TH JUNE, 1939.

	European.	Non-European.	Total.
Cape Province (excluding Transkei)	465	990	1,455
Transkei.....	23	139	162
Natal.....	87	377	464
Orange Free State.....	75	271	346
Transvaal.....	336	795	1,131
TOTAL.....	986	2,572	3,558

TABLE 10.—ENTERIC OR TYPHOID FEVER—NOTIFICATIONS AND INCIDENCE IN CERTAIN LOCAL AUTHORITY AREAS DURING THE YEAR ENDED 30TH JUNE, 1939 (ARRANGED IN ORDER OF INCIDENCE RATE)—EXCLUDING CASES RETURNED AS “IMPORTED” :—

Local Authority.	Notifications.			Incidence per 1,000 of Population.		
	European.	Non-European.	Total.	European.	Non-European.	All Races.
Brandvlei.....V.M.B.	9	25	34	20·79	66·31	41·98
Hanover.....M.	2	40	42	3·28	58·74	32·53
Bonnievale.....V.M.B.	10	25	35	16·64	42·30	29·36
Jagersfontein.....M.	2	52	54	2·05	35·67	22·18
Alice.....M.	—	41	41	—	18·49	13·83
Umtata.....M.	7	37	44	2·98	11·59	7·94
Barkly East.....M.	1	13	14	·96	8·27	5·35
Rouxville.....M.	7	4	11	7·40	3·31	5·11
Burghersdorp.....M.	8	8	16	3·89	2·86	3·30
Dc Aar.....M.	4	11	15	1·76	3·85	2·93
Uitenhage.....M.	11	46	57	1·15	4·13	2·77
Kroonstad.....M.	1	31	32	·19	3·85	2·39
Cradock.....M.	6	14	20	1·63	2·51	2·16
Alexandra.....H.C.	—	32	32	—	1·91	1·91
Hercules.....M.	9	19	28	1·65	1·78	1·74
Queenstown.....M.	6	21	27	·89	1·82	1·48
Beaufort West.....M.	3	8	11	·85	1·81	1·38
Germiston.....M.	18	81	99	·61	1·78	1·32
Roodepoort—Maraisburg...M.	7	44	51	·57	1·29	1·10
Oudtshoorn.....M.	3	10	13	·46	1·49	·98
Bethlehem.....M.	3	7	10	·60	1·30	·96
Boksburg.....M.	10	35	45	·58	·97	·85
Nigel.....M.	1	20	21	·18	·97	·80
Vereeniging.....M.	4	10	14	·85	·71	·74
Springs.....M.	1	63	64	·04	·80	·62
Pretoria.....M.	24	34	58	·32	·83	·50
Krugersdorp.....M.	14	15	29	·67	·36	·47
Johannesburg.....M.	95	139	234	·33	·58	·44
Pietermaritzburg.....M.	5	16	21	·23	·62	·44
Durban.....M.	36	69	105	·39	·42	·41
Bloemfontein.....M.	4	18	22	·17	·60	·41
Benoni.....M.	10	24	34	·43	·39	·40
Kimberley.....Bd.H.	6	9	15	·40	·37	·38
East London.....M.	15	4	19	·66	·15	·38
Randfontein.....M.	1	10	11	·16	·40	·35
Capetown.....M.	38	59	97	·24	·38	·31
Brakpan.....M.	3	15	18	·14	·36	·29
Port Elizabeth.....M.	13	11	24	·24	·20	·22

M. = Municipality.

Bd. H. = Board of Health.

H.C. = Health Committee.

V.M.B. = Village Management Board.

Table 11 shows the number of cases reported during the past ten years.

TABLE 11.—ENTERIC OR TYPHOID FEVER: NUMBER OF CASES NOTIFIED DURING PAST TEN YEARS.

1930	3,775 cases.
1931	4,793 ,,
1932	4,505 ,,
1933	4,389 ,,
1934	8,267 ,,
1935	4,377 ,,
1936	4,384 ,,
1937	4,205 ,,
1938	4,103 ,,
1939	3,558 ,,

14.—LEPROSY.

In 1919 when the Department of Public Health was established the administration of leper institutions and the control of all matters relating to leprosy were not taken over by the newly created department, but remained with the Department of the Interior. Dr. J. A. Mitchell, the first Secretary for Public Health, who came to South Africa in the capacity of Bacteriologist to the Robben Island Leper Institution, gave evidence before the Select Committee of the House of Assembly on the Treatment of Lepers (S.C. 10) in 1918, and again during an examination by the Cabinet Finance Committee in October, 1922. He submitted:—

1. That the annual expenditure on this disease was out of all proportion compared, as a cause of illness and death in the Union, with diseases such as tuberculosis and syphilis, which are of far greater public health importance.
2. That the leper institutions had gradually accumulated a large number of oldstanding chronic cases in which infectivity had become absent or negligible.
3. That a competent medical board should be appointed to examine all patients under institutional segregation, and to classify them as to infectivity and the necessity for continued segregation on public health grounds.
4. That methods of dealing with leprosy required to be brought into line with modern knowledge of the disease.
5. That a Leprosy Advisory Committee should be appointed to include representatives of the South African Institute for Medical Research, the Universities of Capetown and the Witwatersrand and the Health Department, to advise the Government on leprosy matters.
6. That a new Leprosy Act for the Union was required.
7. That steps should be taken to obtain the co-operation of local authorities in dealing with the disease.
8. That the administration of the leper institutions and all leprosy matters should be transferred to the Health Department, it being in the best position to carry out the measures and reorganisation suggested.

These proposals were subsequently endorsed by an interdepartmental conference and thereafter approved by the Government. It was also decided that the transfer should take place on 1st April, 1924, but that prior to this date a medical board should examine leper patients in Government institutions and classify them according to the type of the disease, their infectivity, and the necessity or otherwise for their continued isolation on public health grounds. This board found that of the 2,501 patients examined, 693 or approximately 28 per cent. no longer required isolation on grounds of infectivity or danger to public health. This constituted the first step in giving effect to items 1, 2 and 3 of Dr. Mitchell's recommendations, and boards which have since that time regularly visited the various institutions have discharged no less than 4,716 patients during the fifteen years that leprosy has been controlled by the Public Health Department.

As was to be expected, there was a distinct decline in the numbers of patients discharged after the institutions had been cleared of their accumulation of old chronic "burnt-out" cases: but by 1927 the results of modern methods of treatment began to show themselves and the discharges rose from 100 in 1926 to 225 in 1928. These results slowly

convinced the patients that leprosy was not an incurable disease and the institutions which had previously served only as asylums for the segregation of lepers gradually changed in character and became hospitals for the treatment of leprosy.

About this time, however, an eminent British leprologist attacked our system of compulsory segregation as obsolete and unwarranted and contended that it should be abolished and replaced by a purely voluntary system with home segregation, and leprosy clinics at which patients would be treated on outdoor lines. This criticism could only have come from one unacquainted with local conditions, and without exception all leprologists who subsequently visited the Union have given unstinted praise to the manner in which the leprosy problem is being tackled. The flaw in the previous policy of compulsory segregation was the discouragement of voluntary notification with consequent delay in discovery and appropriate treatment. The results of modern treatment together with the system of release of "arrested" cases has, however, had a pronounced effect on increasing the number of voluntary admissions, especially in the Native territories.

In order to administer successfully the policy of probational discharge of "arrested" cases it was necessary to have a field staff of medical men who could recognise the earliest signs of recrudescence. Institutional treatment of all cases had for so many years withdrawn the clinical material of the general practitioner that leprosy in its earliest active manifestations was only recognised by the few who practised in highly endemic areas. The organisation of periodical refresher courses for district surgeons in co-operation with the University Medical Schools presented the desired opportunity for renewing their knowledge of the disease and so developing a field staff which could effectively control discharged patients during their six years of probation. These refresher courses also account for an increased number of early cases which have during the latter years been admitted to the institutions. In spite of the criticism referred to, it can therefore be maintained that the department has succeeded in giving effect to item 4 of the foregoing suggestions.

Item 5 has been put into effect by the establishment under Government Notice No. 1898 of 11th November, 1924, of the Leprosy Advisory Committee on which the South African Institute for Medical Research and the University Medical Schools are represented. This Committee meets annually to review the position and advise on methods of treatment and administrative policy in general. The appointment of a leprosy research officer and a suitable medical officer to carry out a leprosy survey of the Union was repeatedly urged by the Committee. Due to the difficulty of obtaining suitable candidates, the first-mentioned post could only be filled for a period of three years. Shortages of staff and other circumstances have so far made it impossible to carry out a careful and systematic leprosy survey of the Union, but from circulars to magistrates and district surgeons and by a close study of institution records it has from time to time been possible to take stock of the leprosy position in the Union.

While the contribution from South Africa has unfortunately not been very great, a good deal has been done in other parts of the world to add to our knowledge of leprosy. These advances have been studied with appreciative interest and improved methods of treatment have been applied with such success that the annual discharge rate has nearly doubled itself during the past ten years.

A new Leprosy Act for the Union has not yet materialised as the times have not been propitious for revising the existing legislation under which leprosy has been effectively controlled in the meantime. In view of the knowledge which has been gained in the intervening years and the advances which have been made particularly in connection with the treatment of the disease, the delay which has occurred has probably been all to the good.

The co-operation of local authorities in dealing with the disease has been obtained by the tolerant and sympathetic way in which the public has received the discharged lepers whom they previously held in unreasonable dread. At no time has it been considered necessary or advisable to delegate to local authorities any portion of the responsibility, and leprosy still remains the one disease for which the Department accepts entire control and full financial liability.

Although there has not been a great reduction in the number of patients in our institutions during the past fifteen years it can undoubtedly be claimed that with the change in the character of the institutions, there has also been a change in the type of the inmates. European and mixed coloured patients show a considerable reduction and the problem is now mainly confined to the Native races. Here, too, there has been a change in the picture as we have now begun to draw on the reservoir of early, hitherto undiagnosed cases, who readily respond to treatment. The Department has thus faithfully carried out its undertakings of fifteen years ago, and

although altered circumstances may soon require a revision of the position, there remains no doubt of the success and the progressive nature of the Department's policy up to this point.

The number of lepers in the five institutions remains approximately the same as last year. These are shown in Table 12.

TABLE 12.—LEPER INSTITUTIONS: PATIENTS THEREIN ON 30TH JUNE, 1939.

Institution.	Europeans.		Native.		Mixed Coloured.		Asiatic.		TOTAL.		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Persons.
Pretoria.....	63	31	502	238	62	26	2	2	629	297	926
Mkambati.....	—	—	101	91	—	—	—	—	101	91	192
Emjanyana.....	—	—	342	284	—	—	—	—	342	284	626
Amatikulu.....	—	—	275	177	—	—	—	—	275	177	452
Bochem.....	—	—	49	33	—	1	—	—	49	34	83
TOTAL.....	63	31	1,269	823	62	27	2	2	1,396	883	2,279

Table 13 shows the number of new admissions and recrudesced cases, corrections having been made for transfers to and from the various institutions; the number of patients discharged as arrested and the number of deaths.

TABLE 13.—LEPROSY: FIRST ADMISSIONS, RECRUDESCED CASES, DISCHARGES AND DEATHS, YEAR ENDED 30TH JUNE, 1939.

Institution.	Admissions for first time.	Recrudesced.	Discharged.	Died.
Pretoria.....	299	17	111	86
Mkambati.....	59	9	73	22
Emjanyana.....	193	10	198	64
Amatikulu.....	91	10	60	48
Bochem.....	16	4	5	9
TOTAL.....	658	50	447	229

The number of cases remaining in their own homes is shown in Table 14.

TABLE 14.—LEPROSY CASES REMAINING IN THEIR OWN HOMES ON 30TH JUNE, 1939.

	Certified and Awaiting Removal to Leper Institution.	Home Segregated.	Probationally Discharged from Leper Institutions.		Total.
			Still under Surveillance.	Released from Surveillance.	
Cape Province (excluding Transkei)	—	2	162	504	668
Transkei.....	20	3	678	948	1,649
Transvaal.....	3	—	567	808	1,378
Natal.....	1	—	265	621	887
Orange Free State.....	1	—	107	186	294
UNION.....	25	5	1,779	3,067	4,876

15.—MALARIA.

A. Natal and Zululand.—The prevailing climatic conditions in respect of rainfall, temperature and humidity were favourable for the breeding of vectors and for the propagation of malaria throughout the season under review. Excessive rains in December resulted in most of the larger rivers overflowing and flooding large areas along their banks in the inland districts. Flat coastal areas in Zululand became waterlogged, and recurring heavy rains gave rise to extensive pool formation and seepages. These conditions resulted in extensive and prolific breeding of *A. gambiae*. As a consequence the infestation of human habitations in the uncontrolled areas of Zululand by this species was exceptionally heavy averaging over 100 per hut in sections from which collections were made.

Intermittent heavy rains fell throughout January, February and March, and the maintenance of surface pools over this period gave rise to the spread of *A. gambiae* breeding over the inland and northern districts of the province up to altitudes of 4,000 feet.

The temperature and humidity were abnormally high throughout the late summer and autumn months and in view of the increased prevalence of vectors in association with human carriers, all factors necessary for an outbreak of epidemic malaria existed.

Notwithstanding the favourable climatic conditions the incidence of malaria, although more widespread than usual, showed no increase in total cases over the previous year.

The following comparative table of positive blood slides examined at the Government Laboratory, Durban, since 1931, shows an earlier seasonal increase than usual but with no marked rise during the annual peak period in April:—

TABLE 15.—MALARIA: BLOOD SLIDES EXAMINED.

Season.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	Total.
1931-32.	—	15	14	24	20	40	67	159	613	1,334	915	588	3,789
1932-33.	178	95	79	96	103	143	225	515	975	1,055	837	404	4,605
1933-34.	95	46	33	39	30	37	120	344	826	935	514	237	3,256
1934-35.	66	46	35	35	22	33	37	29	38	44	38	3	426
1935-36.	4	10	4	9	11	5	7	3	59	114	63	40	329
1936-37.	5	6	2	9	11	5	6	15	16	233	116	38	462
1937-38.	6	2	3	4	4	11	7	16	76	128	133	60	450
1938-39.	11	1	3	4	4	3	8	45	120	130	85	35	449

Of the total 449 positive slides examined 82 were from Europeans, 12 Indian and 355 Native cases. The European cases included 17 from outside the province representing persons either passing through Durban or on holiday on the Natal coast, while 285 of the Native cases were from the coastal reserves of Zululand.

The various units comprising the malaria control organisation in the province and the staff employed during the season are summarised hereunder:—

TABLE 16.—MALARIA: CONTROL ORGANISATION, NATAL AND ZULULAND. *

Unit.	Trained.		Untrained.
	European.	Native or Indian.	Native or Indian.
Urban Local Authorities (40).....	54	38	115
Statutory Malaria Committees (19).....	29	10	605
Voluntary Groups (10).....	3	12	30
South African Railways.....	9	—	36
Union Health Department.....	9	58	146
TOTALS.....	104	118	932

The figures for malaria committees include Europeans employed by the larger sugar estates in addition to committee inspectors, and the untrained staff is made up of sprayers employed by individuals within the committee areas.

The methods of control as in past years embody anti-larval and anti-adult measures.

Larvicidal measures take precedence in urban areas where permanent measures including drainage and tree planting are gradually eliminating potential breeding foci and thus reducing the annual expenditure on oil and labour.

In the malaria committee areas which are mostly rural, anti-larval and anti-adult measures are considered of equal importance when vectors are located.

Anti-adult control takes precedence in the Native areas where larvicidal measures are only undertaken in restricted sections adjoining European settlements.

The Department of Native Affairs is rendering valuable assistance in respect of permanent control measures by planting gum trees (*Eucalyptus saligna*) in waterlogged sections known to be prolific areas of *A. gambiae* breeding. The effect of this work is now becoming apparent and many danger spots have been completely eradicated in this way.

In the Native areas control measures are directly carried out by the Department and the organisation and supervision is effected by the European inspectors stationed at Umkomaas, Durban, Stanger, Eshowe, Empangeni, Matubatuba, Nongoma, Vryheid and Greytown.

The trained Native assistants are mainly responsible for supervision of control measures in the Native reserves. Their duties embrace the location of vector breeding centres and the spotting of adult vectors in dwellings prior to the institution of control, and the investigation of all reports of sickness in their allotted areas.

Quinine depôts are established at convenient points in all Native reserves and local Natives are advised of the one nearest to their kraal where a free issue of quinine is available.

Since the inception of organised systematic control measures in this province there has been a very marked reduction in the incidence of and mortality from malaria. This reduction is well illustrated by the following records of admissions to the Addington and King Edward VIII Hospitals at Durban:—

TABLE 17.—MALARIA: NUMBER OF CASES ADMITTED TO HOSPITAL.

Year.	MALARIA CASES ADMITTED.					Total Admissions : All Diseases.
	European.	Coloured.	Natives.	Indians.	Total.	
1929.....	200	9	345	7	561	9,955
1930.....	127	13	547	59	926	10,410
1931.....	260	58	716	93	1,127	11,346
1932.....	610	127	1,343	173	2,252	13,578
1933.....	376	56	805	65	1,302	14,161
1934.....	351	99	1,254	148	1,852	16,614
1935.....	53	6	72	12	143	16,405
1936.....	30	1	32	5	68	15,920
1937.....	50	7	20	3	80	22,889
1938.....	23	1	36	4	64	26,009

It will be seen from this table that malaria in comparison with other diseases has ceased to be a major cause for admission to hospital, in fact, it now ranks as a very unimportant cause of morbidity in the community.

The following figures compiled from reports by the trained Native staff since 1931 provide further evidence of a general reduced incidence of the disease in areas remote from hospital facilities:—

TABLE 18.—MALARIA: INCIDENCE OF THE DISEASE.

Season.	Natives visited.	Sick.	Deaths.
1931-32.....	152,937	38,889	3,677
1932-33.....	185,600	28,651	1,000
1933-34.....	281,985	31,270	1,003
1934-35.....	268,260	10,863	119
1935-36.....	257,860	3,171	72
1936-37.....	206,896	2,571	115
1937-38.....	298,243	1,912	46
1938-39.....	380,003	1,557	40

The season 1934-1935 marked the introduction of anti-adult control on an organised systematic basis, and although conditions favourable to malaria propagation have occurred in the intervening period the number of infections has remained low.

As a check on the efficacy of weekly anti-adult (insecticidal) control regular dissections were made of adult mosquito vectors collected from controlled and uncontrolled sections during the past season.

Of 564 *A. funestus* and 540 *A. gambiae* from controlled areas 2 or 0·18 per cent. were found infected.

Of 52 *A. funestus* and 690 *A. gambiae* from the uncontrolled areas 11 or 1·48 per cent. were found infected.

It is of interest to note that the infected adults were collected from a controlled section of an endemic area adjoining the uncontrolled areas.

All farms in malarious sections of the northern districts of Natal and Zululand outside the statutory controlled areas were periodically visited by departmental inspectors throughout the season. Control measures in these areas are almost entirely confined to insecticidal spraying of dwellings and considerable progress has been made in the past few years in getting farmers to carry out this work regularly.

The Government Laboratory at Durban continues to supply free services for the examination of blood slides, and the identification of mosquito specimens. During the year 2,040 slides were examined and 68,785 mosquito specimens, larvae and adult, were identified.

The closest co-operation is maintained between the Department and the various local bodies carrying out control measures throughout the province. Circulars showing the localities from which mosquito vectors have been identified are sent fortnightly to all units during the season.

Departmental inspectors convene monthly meetings of all malaria inspectors working in adjoining areas for the purpose of exchanging views and overcoming any local difficulties which arise from time to time.

The success achieved in the control of malaria in this province is very greatly due to the ready co-operation on the part of organised bodies and individuals with the department's officers and the willingness to act on advice given by the technical staff.

B. Transvaal.—In the Transvaal increased activities have followed the appointment of further members to the staff of the Tzaneen Field Station. This station now consists of the Senior Malaria Officer with a staff of two health inspectors, two technical assistants and other subsidiary staff stationed at Tzaneen; a health inspector at each of the following places: Nelspruit, Lydenburg, Nylstroom, Pietersburg, Piet Retief, Groblersdal, Zoutpansberg and Potgietersrust; and health visitors at Nylstroom, Pietersburg, Zoutpansberg and Potgietersrust. Native malaria assistants numbering 76 are distributed through the following areas: Pietersburg, Louis Trichardt, Sibasa, Letaba, Sekukuniland, Pokwani, Hammanskraal, Potgietersrust, Piet Retief, Nelspruit, Barberton and Bushbuckridge.

Heavy rains throughout the Transvaal in December, January, February and March provided ideal conditions for the extensive breeding of *A. gambiae* so that the subsequent widespread epidemic of malaria was not surprising. The difference between the two major epidemics, i.e. 1937 and 1939, was one of extent rather than severity—the latter reaching over a far vaster area. This was entirely the consequence of the greater rainfall. The greatest precipitation was east of the Great North Road culminating in the heaviest fall known for generations in certain areas, especially the Lydenburg district of the Eastern Transvaal. The malaria epidemic then followed reaching its highest incidence in the Olifants River Valley. This valley was affected from its lower reaches on the western side of the Drakensberg, through Sekukuniland and Native reserves of Pietersburg and Potgietersrust, the Springbok Flats, eventually reaching as far south as Pretoria (4,593 feet) and Bronkhorstspuit (4,679 feet). Isolated cases were found at still higher altitudes, e.g. Johannesburg (5,735 feet) and Springs (5,338 feet).

This epidemic began early in January when inspectors operating along the Olifants River Valley in the Potgietersrust area reported first infections of malaria occurring simultaneously on a number of farms. Further infections over a wider area rapidly followed and in March a serious epidemic was raging in the districts of Pretoria, Middelburg, Potgietersrust, Lydenburg, Pietersburg, Barberton and Rustenburg. The epidemic gradually receded from the higher altitudes, but persisted longest in the Olifants River Valley continuing there until June. The mortality rate throughout the area was low, and all the evidence indicates that it never rose above 2·5 per cent. This rate only occurred in certain small circumscribed localities in Sekukuniland and round about Pokwani in the Middelburg district. This was to a certain extent due to a breakdown of organisation caused by the phenomenal floods, impassable roads and the consequent transport difficulties.

The following table has been arrived at in close collaboration with the field staff and Resident Native Commissioners, and is the best that can be expected under the circumstances:—

TABLE 19.—MALARIA: NUMBER OF DEATHS IN CERTAIN DISTRICTS.

District.	Population.	Deaths.	Percent.
<i>Pietersburg</i> :—			
Grootspelonken	40,000	200	·50
Bochem	38,000	150	·39
Pietersburg	209,000	750	·25
<i>Louis Trichardt</i> :—			
Sibasa	153,000	600	·39
Louis Trichardt	100,000	500	·50
<i>Lydenburg</i> :—			
Pokwani	50,000	1,000	2·00
Schoonoord	75,000	1,500	2·00
<i>Letaba</i> :—			
Tzaneen	36,500	120	·33
Leydsdorp	25,000	130	·52
Duivelskloof	55,800	600	1·08
<i>Potgietersrust</i>	86,000	2,400	2·70
<i>Nylstroom</i>	45,000	530	1·18
<i>Groblersdal</i>	20,500	500	2·48
<i>Piet Retief</i>	40,000	50	·125
<i>Nelspruit</i>	15,000	82	·55
<i>Bushbuckridge</i>	16,000	137	·86
<i>Barberton</i>	12,000	62	·52
TOTALS	1,018,800	9,311	·91

The epidemic nature of the disease on this occasion required additional staff and organisation to control it. As the brunt of the outbreak fell on the Native communities the Native malaria assistants were especially involved. The existing staff of 75 assistants distributed amongst the 12 Native Commissioner areas was supplemented by an additional staff of 4 Europeans and 120 Natives used as quinine "runners". Dépôts were arranged at strategic points throughout the Native reserves. From these dépôts quinine, insecticides and spray pumps were distributed. The following table gives the material issued in this way in the Native areas:—

TABLE 20.—MALARIA: DISTRIBUTION OF SPRAY PUMPS AND INSECTICIDES.

District.	Pumps.	Pyagra. (Gallons).	Paraffin. (Gallons).
Pietersburg.....	8,864	332	5,319
Louis Trichardt.....	8,572	188	834
Piet Retief.....	340	5	65
Potgietersrust.....	2,087	68	1,094
Lydenburg.....	3,714	105	953
Nelspruit.....	844	75	200
Tzaneen.....	1,080	35	544
TOTALS.....	25,601	798	9,309

The indigent European population was assisted financially by the Transvaal Provincial Administration as in previous years, enabling it to purchase insecticides and equipment at cheap rates. During the epidemic, to facilitate the distribution of the materials, dépôts were established at all magisterial centres in the malarious regions. Secondary dépôts were then created by the magistrates at suitable centres in their districts. Further assistance was obtained for the field inspectorate staff who were hard pressed to meet all calls during the peak months of the outbreak. This staff distributed the following supplies through the abovementioned dépôts:—

TABLE 21.—MALARIA: DISTRIBUTION OF SPRAY PUMPS AND INSECTICIDES.

District.	Jake and Atlantic Pumps.	Flit Pumps.	Pyagra.	No. European "Runners".
Pietersburg.....	173	268	49	1
Louis Trichardt.....	15	15	17	—
Piet Retief.....	54	70	13½	—
Potgietersrust.....	98	704	109	2
Lydenburg.....	37	476	138	—
Groblersdal.....	19	58	9	2
Nylstroom.....	—	365	41	—
Middelburg.....	—	—	—	2
Nelspruit.....	96	279	18	—
TOTALS.....	492	2,235	394½	7

This table does not reflect issues from all magisterial centres, the figures for which are not yet available.

It is to be regretted that the scheme for assisting the poorer Europeans in the rural areas to secure satisfactory dwellings, properly mosquito-proofed, has been withdrawn. While in operation this scheme did an immense amount of good in protecting such individuals from malarial infection.

The routine parasitological work undertaken at Tzaneen is given in the following table:—

TABLE 22.—MALARIA: PARASITOLOGICAL WORK, TZANEEN.

District.	ENTOMOLOGICAL FINDINGS.				PARASITOLOGICAL FINDINGS BLOOD SMEARS.	
	Adults.		Larvae.			
	Vectors.	Others.	Vectors.	Others.	Total Examined.	Total Positive.
Pietersburg.....	51	39	6	93	34	22
Piet Retief.....	1,123	21	84	180	247	126
Potgietersrust.....	3,605	262	710	385	720	505
Lydenburg.....	2,208	377	313	1,307	2,368	1,717
Groblersdal.....	2,258	1	514	118	67	47
Nylstroom.....	1,346	16	253	73	174	161
Nelspruit.....	4,212	433	1,149	1,107	828	571
Tzaneen.....	8,638	404	1,657	3,998	4,732	1,716
TOTALS.....	23,441	1,553	4,686	7,261	9,170	4,865

During the year an attempt was made to ascertain how far specific anti-malarial drugs could be used in the prevention of the disease. In an experiment, 5 Native groups all living under hyper-endemic conditions were used. No insecticidal measures were instituted. The mosquito infectivity rate was known from previous work to be from 10-15 per cent., the spleen rate in children under 10 years being 70 per cent. The following treatment was accorded the respective groups:—

1. Course of complete treatment followed by plasmoquin: weekly dosage with plasmoquin.
2. Weekly dose of atebrin.
3. Weekly dose of plasmoquin.
4. Weekly dose of quinine.

The fifth group was a control group.

The experiment was continued for 4 months, blood smears being examined weekly. Unfortunately the experiment was quite inconclusive.

During the year synthetic drugs were issued to every district surgeon.

The use of the Tzaneen Field Station for educational purposes has continued. Classes from the Witwatersrand Medical School, and the Transvaal Education Department were instructed in the laboratory and field aspects of malaria. Increasing advantage is being taken both by official and non-official organisations of the information possessed by the Station.

C. Railway Areas.—The distribution of malaria during the past season was not limited to the control belt of Natal and the low-lying parts of the Transvaal as in previous years. The widespread rainfall and the high temperature and humidity favoured breeding of vectors over practically the whole of the Transvaal. Even at Pretoria and on the Rand, with altitudes of 5,000-6,000 feet active breeding prevailed.

Washaways in both provinces were frequent occurrences; by increasing the exposure and adding to the adverse conditions under which these emergencies are carried out they were responsible for their own quota of fever.

In the Transvaal unprecedented rainfall not only favoured intensive and widespread breeding, but at times adversely affected larval control by washing away the oil as fast as it was sprayed on the water. Much reliance had, therefore, to be placed on anti-adult measures. No efforts were spared to ensure that this phase of the work was adequately performed.

Two men were placed on the Waterval Boven-Nelspruit section for the greater part of the season. This section in normal years is comfortably worked by one man, but in the beginning of February breeding assumed such alarming proportions that an additional unit from Pretoria was necessary. All Natives' quarters at centres which showed a high infestation rate were sprayed out three times a week and the rest of the stations twice weekly. During the first week of March conditions were such that, in order to cope with the increased work caused by the abnormal rains it was necessary to appoint three more Native oilers.

On the section south of Nelspruit the conditions were even more acute and early in the season it was found necessary to spray all Native quarters at each station daily.

At Komatipoort the Railway Administration had the co-operation of the Department and Transvaal Gold Mining Estates and it was again possible to control an area of about two miles radius involving 750 huts. Right from the commencement of the season it was necessary to intensify operations at this centre. This is the first year since malaria control was undertaken that it has been necessary to intensify control measures to such an extent at this centre. The European quarters were sprayed out regularly three times a week. To protect the men on night duty a Native was detailed to spray out the cabin and office which these men occupy at regular intervals during the night.

At Waterval Boven breeding of *A. gambiae* was very active and intensified measures had also to be instituted. All quarters situated below the railway line were sprayed out daily during the months of March and April, the Native compound also receiving regular attention. The concession of a free issue of pyagra was afforded to all residents of this centre. The advent of a bridge camp with poorly constructed houses sited below the railway line greatly aggravated the position.

On the section Rubbervale-Beitbridge, in spite of heavy rains, conditions never assumed such proportions as to warrant increased labour.

The task involved in spraying out a matter of 4,407 huts weekly in the recognised malaria areas on the Eastern Transvaal System alone, taking

the trying climatic conditions into consideration, is no mean one and the staff acquitted themselves admirably of this duty. There is not the slightest doubt that, had it not been for the effective anti-adult measures, the results would have been totally different.

The Pietersburg-Pretoria and branches Pretoria-Middelburg, Pretoria-Rustenburg and Steelpoort lines were patrolled in order to locate breeding of vectors at the earliest opportunity. Towards the end of February conditions were such as to warrant the institution of active control measures on all the abovementioned sections with the exception of the Rustenburg line. During the first week of March, in order to cope with the increased work on these sections, the Native staff was increased by three units. The Naboomspruit-Zebediela line, Marble Hall and Bronkhorstspuit stations were the worst affected centres as far as the incidence of malaria was concerned. The rest of the area, in spite of a high infestation rate of buildings, was remarkably free of malaria.

A disturbing feature, which might have had far-reaching results, was the introduction of bridge construction staff in the Eastern Transvaal mostly accommodated in very poor structures. One camp was situated at Waterval Boven and a second at Nelspruit. From these centres as headquarters the men worked out at different points along the line during the week and returned to their families for week-ends. Whilst the men were away from headquarters they were accommodated in huts.

Most Natives engaged on bridge construction have been transferred with the European staff from other provinces, the majority being from Basutoland. These Natives are quite "unsalted", are just as prone to contract malaria as the European and must in climatic areas be afforded suitably screened protection.

In Natal subnormal conditions, as far as the breeding of malaria vectors is concerned, prevailed on the coastal belt up to Empangeni. This feature is largely attributable to the efficient control measures made possible by the network of malaria committees extending over all of the areas mentioned and working in close co-operation with the Railways Administration's health staff.

Quite a different state of affairs existed north of Empangeni, particularly north of Mtubatuba. Here conditions similar to those of the Transvaal existed. During the season meteorological conditions in this section became very favourable for the breeding of vectors, necessitating the increase of European supervision and Native labour. The policy of drafting health foremen from non-malarious areas had been adopted previously but it had never been necessary to draft men to this section so early in the season.

The infestation rate of buildings in this area was the highest on record and the position was tremendously aggravated by the presence of numerous relaying gangs. Notwithstanding the high record of adult catches, the malaria incidence amongst European and non-European staff was remarkably low. All Native quarters on this section at stations and sidings were sprayed three times a week. Much reliance had to be placed on these measures since the huts were by no means mosquito-proof. The repairs were attended to only towards the latter half of the season and have not yet been completed.

When the Railways Administration embarked upon its anti-malaria campaign some seven years ago, it had of necessity, in order to safeguard the health of its employees, to undertake control measures on certain private lands adjoining Railway property. Gradually the owners of these lands were asked to co-operate by contributing something towards the cost of control. Although in certain instances the amount agreed upon was below the cost of the actual work performed, it was felt that before the owners of certain properties realised the value of malaria control from an economic and labour saving aspect it would pay the Administration to have the work performed by its health staff. That this has been the case has been adequately proved by the good results obtained at the centres where this procedure has been in vogue. The time, however, has arrived to go one step further. All landowners now fully realise the value of malaria control and, therefore, the fear that the work will be performed in a slipshod way if undertaken by individual companies and landowners no longer exists; for that reason it is felt that such parties should be called upon to undertake their own malaria control measures. There are certain instances, however, where it will always be in the interests of the Railways Administration to undertake work off Railway property, but it is hoped that by next season these centres will have been reduced to a minimum.

As there is reason to believe that the Administration's policy for the spraying of trains as an anti-malaria precaution for the travelling public is not generally understood, it is here recapitulated:—

- (1) Since 1933 all night-period trains travelling to and from the climatic areas of the Union during the malaria season have been sprayed with a reliable insecticide either at the respective starting

points or *en route*, by bedding and other train staff, station staff or health staff, according to the most practical working arrangements. The term "climatic area" is a rather technical one. For practical purposes such areas are divided into four degrees of "malariousness", but for the purpose of train spraying it may be said that all areas included in the three most intense of these degrees are regarded as climatic areas. In so far as the fourth kind of area is concerned, i.e. where malaria may occur as an unusual phenomenon in rare years, train spraying is also carried out when the conditions referred to are present. The measures quoted under this paragraph are a fixed departmental routine.

- (2) All touring trains wherever their itinerary takes them are supplied with facilities for insecticidal spraying and the staff have instructions to undertake this routine in danger areas or when individual passengers make the request.

Not all passengers favour the spraying out of their compartments, but as it is apparent that a good many would welcome the sense of security afforded by an extension of these facilities both against malaria mosquitoes and the bites of non-malaria mosquitoes where the latter nuisance exists, it has been decided as an additional amenity to the travelling public to extend these services with effect from November, 1939. Under this arrangement the measures quoted under paragraphs (1) and (2) will be continued as a routine but, in addition, trains travelling on all routes through mosquito areas of the Union will be supplied with insecticide spray outfits and passengers will be able to request the bedding steward to spray out their compartments as a free service during the mosquito breeding season, i.e. approximately November to June. These facilities will be advertised through the medium of timetables, menu cards and wine lists.

This season train spraying on the Eastern Transvaal and Natal systems was intensified as from the middle of March. On the Eastern Transvaal it was found necessary for the first time to spray the Marble Hall train. Arrangements were also made to spray passenger trains from Rhodesia at Mafeking, and in this section between this centre and the Rhodesian border.

The usual practice of the health staff undertaking permanent anti-malaria measures during the malaria off-season was again followed.

The works that have been systematically carried out over a period of seven years have greatly assisted with malaria control. The thousands of blue-gum trees planted on the north and south coasts of Natal and in the low veld of the Transvaal have been instrumental in drying up many marshy places which formerly were very favourable breeding spots for *A. gambiae*, and required much attention and oil to control; the network of subsoil and other drains put in from time to time have also cut down the cost of control a great deal.

The following table summarises the work done in both provinces during the past season:—

TABLE 23.—MALARIA: WORK DONE BY RAILWAYS AND HARBOURS ADMINISTRATION.

	Natal.	Transvaal.	Total.
	Yds.	Yds.	Yds.
Subsoil drains, pipes.....	—	50	50
Open drains, earth.....	—	5,505	5,505
Drains, cleared and regraded.....	19,371	1,270	20,641
Training of stream banks.....	—	1,200	1,200
		Cubic Yds.	Cubic Yds.
Depressions and borrow pits filled in.....	—	5,697	5,697
Trees planted.....	—	2,000	2,000

In addition to the above, a gang of 14 Natives under the supervision of a health foreman spent forty-one days in levelling the floor of the Tugela quarry in Natal. This measure was instrumental in saving much oil.

D. Malaria-tolerant Native Labour.—Acting on the recommendations in the Swellengrebel report the Department has, as a matter of policy, discouraged the recruiting of southern non-tolerant Native labour for work in the Zululand sugar belt. For this purpose the Tugela River is defined as the southern boundary of the low-lying endemic malarious areas.

As a consequence it should follow that industry and agriculture in this area should have first claim on the available malaria-tolerant labour supply.

Urgent representations have been made to the Department by all the statutory malaria committees in Zululand on the need for conserving the local labour resources and to prohibit recruiting of this labour for other areas. The following resolutions have been sent to the Department:—

- (1) That in view of the acute shortage of labour which exists on the sugar plantations and mills in Zululand to-day and which becomes more acute during the crushing season, attention is drawn to the potential danger to the malaria campaign.

- (2) That unless an adequate supply of malaria-tolerant Native labour can be ensured for use in these highly malarious areas, planters will be forced to augment their gangs with southern labour with disastrous results to the malaria campaign.

The Department was requested to protest vigorously to the Native Affairs Department regarding the steady drain on the supply of malaria-tolerant labour which takes place owing to organised recruiting for labour elsewhere, and to have reserved for use in malarious areas an adequate supply of malaria-tolerant labour.

The recently published report of the Native Farm Labour Committee deals with this matter on page 139 *et seq.* This report states that "In the present condition of the Union labour market an opening does exist for the employment of Portuguese Natives in the Zululand malarial areas without detriment to Union interests". Also that "only malaria-tolerant labour should be employed in this area and all non-tolerant labour, whether recruited or voluntary, should be excluded".

The report states further that "Portuguese labour should not be made available to other areas until the requirements of the malarial areas have been satisfied. The employment of such Natives in other areas without permission should not only make both parties guilty of an offence, but should also make the employer liable for the cost of removal of the Natives".

The committee in its report remarks that "the supply of foreign (i.e. Portuguese) labour is by no means a security against shortage in the future; it is an unstable force at the mercy of agencies which the Government of the Union can neither influence nor control".

It is thus apparent that the Zululand malarial areas cannot rely solely, for meeting their labour requirements, on having reserved to them the available Portuguese Natives who come across the Portuguese-Zululand border; in this respect the southern portion of the Zululand malarious areas is particularly unfortunate in that the northern area is liable to tap this source of supply and leave little for the southern area.

In view of the disastrous results which have in the past followed the importation of non-tolerant labour to meet the requirements of the malarious areas of Zululand, the Department considers that organised recruiting of tolerant labour in the magisterial districts of Ingwavuma, Ubombo, Hlabisa, Lower Umfolozi, Mtunzini, Eshowe and Ngotshe for labour elsewhere should be prohibited.

The prohibition of organised recruiting in these districts will effectively stop the influx of non-tolerant labour into these areas and thus very materially promote the health of these Natives.

16.—PLAGUE.

Outbreaks of Plague in the Union.—During the year 77 cases of plague were reported. They are summarised in Tables 24 and 25. The bubonic form of the disease prevailed and there were no serious pneumonic outbreaks.

TABLE 24.—DISTRIBUTION OF HUMAN PLAGUE AMONG THE DISTRICTS OF THE THREE AFFECTED PROVINCES.

PROVINCE.	EUROPEAN.		NON-EUROPEAN.		TOTAL.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
<i>Cape.</i>						
Glen Grey.....	—	—	36	9	36	9
Port Elizabeth.....	—	—	5	—	5	—
Venterstad.....	—	—	2	2	2	2
3 Districts.....	—	—	43	11	43	11
<i>Natal.</i>	—	—	—	—	—	—
<i>Transvaal.</i>						
Lichtenburg.....	—	—	2	1	2	1
Ventersdorp.....	—	—	3	—	3	—
2 Districts.....	—	—	5	1	5	1
<i>Orange Free State.</i>						
Bloemfontein.....	—	—	1	—	1	—
Heilbron.....	1	1	8	4	9	5
Kroonstad.....	—	—	2	1	2	1
Philippolis.....	—	—	2	1	2	1
Thaba 'Nchu.....	—	—	6	6	6	6
Ventersburg.....	—	—	2	1	2	1
Vredefort (Kopjes).....	—	—	4	1	4	1
Winburg.....	—	—	3	2	3	2
8 Districts.....	1	1	28	16	29	17
Union.....	1	1	76	28	77	29

TABLE 25.—HUMAN PLAGUE CASES AND DEATHS REPORTED DURING THE PAST 18 YEARS.

Year ended 30th June.	Number of Cases.	Number of Deaths.
1922.....	42	23
1923.....	2	1
1924.....	372	235
1925.....	112	68
1926.....	71	46
1927.....	75	56
1928.....	39	31
1929.....	65	42
1930.....	145	89
1931.....	71	44
1932.....	22	16
1933.....	31	16
1934.....	39	29
1935.....	290	184
1936.....	253	165
1937.....	52	17
1938.....	70	58
1939.....	77	29

Four of the five cases from Port Elizabeth came from the enzootic area of Korsten where the outbreak started in March, 1938; this was described fully in the annual report for the year ended 30th June, 1938. Since September no case of rat or human plague has been found.

Attention was directed in last year's report to the increasingly important part played by the domestic rat (*Rattus rattus*) in the epidemiology of plague in country districts and the consequent threat to urban areas. The Chief Rodent Inspector reported that in the northern Free State, outbreaks, both this and last year, were caused by infection derived from an epizootic in rats, which died independently of an epizootic in veld rodents. He pointed out further that the multimammate mouse (*Mastomys coucha*), one of the chief sources of infection in man, has to a large extent been replaced by *R. rattus* in farm buildings. *R. rattus* lives in closer contact with man than the multimammate mouse. These facts, coupled with the fact that *R. rattus* is frequently carried from place to place in motor and other forms of transport are enough to demonstrate the potential dangers which face urban areas, which almost invariably support a large rat-population.

Mortality amongst domestic rats on farms in the northern Free State in the Heilbron area was reported or was known to have taken place before any human cases occurred. Plague was proved to have been the cause of death of some cats that had died in this area. Subsequently a number of cases of human plague occurred. In addition to these outbreaks, one case occurred in the Heilbron Location. Investigation by the Chief Rodent Inspector and by the Senior Assistant Health Officer, Johannesburg, showed that there had been a progressive reduction in numbers of domestic rats from the upper portions of the town to the lower, where the location is situated. In the upper portion of the town the rats appeared to be normal; that is, signs of infestation were recent and accorded with the amount of harbourage and food available; however, towards the lower portion of the town and in the location there was increasing evidence that rats had diminished. The measures taken by the local authorities previous to the occurrence of this case of plague were not enough to have caused the marked difference between the state of the rat population in the upper and lower parts of the town. Rat destruction was greatly intensified throughout the town and no further plague cases occurred.

A series of outbreaks of plague occurred in the Glen Grey district in the Transkei. In all 36 cases (34 of bubonic and 2 of septicaemic plague) were reported. The outbreaks followed mortality in domestic rodents (*R. rattus*, *Mastomys coucha* and *Mus musculus*). In some instances one species appeared to be responsible and in others all or a combination of two species were concerned.

Survey of Rodents in the S.W. Cape Province.—Following the Department's decision to keep a close watch on the rodents, both domestic and veld, in the plague-free areas of the Cape Province, a Rodent Inspector of the Department carried out a series of surveys during the year of the country round Capetown from Bredasdorp in the south-east to Vredenburg and Eendekuil in the north. To the north of Vredenburg and Eendekuil lies the rodent-free belt running from Eland's Bay to the Olifants River Valley which together with mountain barriers protects the veld rodents in the grain-growing districts of the Cape from plague infection passing from the endemic area in the north.

It was found that in the area as a whole, gerbilles (*Taterona afra*) and other veld rodents were numerous. Gerbilles were widespread and their

colonies showed signs of great activity. No evidence was found of any reduction in numbers at any point. Rats (*R. rattus*) were always met with in farm buildings and in some instances very heavy infestation was discovered. Demonstrations in the use of the cyanogas pump for gassing rats were made throughout the area, at the request of farmers and other interested persons, and the method of poisoning gerbilles with strychnine-soaked wheat was explained and its cheapness and effectiveness was stressed.

This survey shows that the state of the rodents in the area is such that should plague infection reach there it would lead to the establishment and spread of plague amongst the gerbille population and ultimately to the rat. There is thus every reason why farmers and local authorities should adopt strong anti-rodent measures, which will not only guard them against the possible introduction of plague, but will also benefit them by preventing damage to crops by gerbilles, and to materials, stored products, and buildings, by rats.

Inspection and Survey in the Union with Special Reference to Urban Areas.—The Department has been fortunate in retaining the services of Dr. L. Fourie. He has been appointed Plague Consultant to survey the general plague situation in the Union, with special reference to the menace of rat-plague to urban areas, and to train personnel in anti-plague work under urban conditions. He began the first tour of inspection in June with a survey of the situation in the Transkei. It is proposed to continue with the coastal area from East London to Capetown and to follow with a survey of the state of the rodents in the Western Province to the north and east of Capetown. He was accompanied by Rodent Inspector Leahy and for part of the time they were joined by the Medical Inspector for the Transkei, Dr. R. Smit, Typhus Inspectors Bunn and Golding and Rodent Inspector Herbst.

Particular attention was paid to training the inspectors in anti-plague measures and in the procedure to be adopted. It is very desirable that data on rodents and fleas should be collected during the course of inspection and subsequent measures. A scheme for a systematic attack was drawn up which is summarised here. It is of general application but applies particularly to anti-rodent procedure in Native huts:—

- (1) Thorough preliminary inspection for burrows and harbourages both outside and inside the hut, with special attention to discovering the species of rodents infesting the hut.
- (2) The collection of (a) loose soil at the entrances of holes in the floor and walls, (b) floor sweepings and (c) nests, into separate numbered bags for subsequent examination for fleas, careful notes being taken of the nature and source of the contents of each bag, the locality and date. Fleas to be collected from rodents caught or gassed and preserved in 70 per cent. alcohol. The specimens so collected to be forwarded to the Ecologist attached to the Department, who will supply the necessary forms, tubes and other requirements.
- (3) The gassing of all harbourages from the floor upwards, paying particular attention to the tops of the walls and the thatch.
- (4) The deverminisation of floors by flaming with a blow-lamp or by applying paraffin emulsion.

A survey of rodent-infested premises in locations, townships and trading stations in the Glen Grey district revealed conclusive evidence of heavy mortality having taken place in domestic rodents (*R. rattus*, *Mastomys coucha*, *M. Musculus*). Buildings where signs of past infestation were many showed very little recent evidence of rats. These observations were corroborated by reports of mortality prior to human outbreaks which started in November.

The following species of wild rodents were found in the area: gerbille (*Taterona*), Karoo rat (*Myotomys*), vlei rat (*Otomys*), striped mouse (*Rhabdomys*), multimammate mouse (*Mastomys*), long-eared mouse (*Malasothrix*) and the dwarf mouse (*Leggada*). Gerbilles were found to be irregularly distributed owing to variations in soil; they were found to have spread from the sandy into the harder soils in the burrows of mole-rats. The indications point to an epizootic having been active among the gerbilles during the last two years. In the Glen Grey and St. Marks areas, mortality had occurred more recently than in the Indwe valley, Tsomo region and on the Engcobo Flats, where they were again increasing in numbers. Further south in the Butterworth district, the epizootic appeared to have been of still more recent origin than in Glen Grey. Owing to the irregular distribution of gerbilles there is every possibility that it may still be in progress in certain parts of these districts and that further isolated outbreaks of human plague may occur.

Cases of plague in this area have occurred only in the last few years and the Native inhabitants are for the most part ignorant of the symptoms and of the mechanism of plague infection. Intensive propaganda and the inclusion of a course of training in anti-plague measures in the Native agriculture course would do much to overcome the present ignorance.

Ecological Investigations.—The lines to be followed in the first part of the ecological work were outlined in the annual report, 1937-38.

In September (1938) a Field Station was established at Holfontein, near Kroonstad, O.F.S., an area where human plague cases had occurred in the past. It has since served as a centre for the field work.

The staff has consisted of the Ecologist, one European and two permanent Native assistants.

Dr. de Meillon, Entomologist in the South African Institute for Medical Research, has been closely connected with the investigation, both in the field and in the laboratory. The laborious work of identifying the large collection of fleas has been done entirely by him and this, together with his co-operation in microclimatic studies and experimental work on fleas, has contributed very materially to the progress of the investigations.

The Zoological Survey is carrying out a rodent and flea survey at Onderstepoort, which is proving valuable, particularly for comparative purposes. Contributions to the Flea Survey of the Union have also come through the Zoological Survey's field organisation.

Pathological specimens have been submitted to the South African Institute for Medical Research for examination for plague.

The investigations have been confined in the main to working out and testing field methods; to collecting, by means of field surveys and monthly trapping, data on the different species of rodents and their fleas and the conditions under which they live: thus contributing to a fuller understanding of the means by which plague infection passes from the veld rodent reservoir through domestic rodents to man.

Starting with the primary reservoir of plague in the veld—the gerbille (*Taterona brantsi*) population—the investigation later included work on the domestic rat (*Rattus rattus*) population living in farm buildings. It has now reached a point when its scope is being extended to cover the rat population living in a town (Kroonstad).

The investigation of the rodent populations under these different conditions has the same end in view and proceeds along similar lines. Information is sought on numbers and changes in numbers and powers of increase by means of census methods, and examination of the reproductive state; fleas and other ectoparasites from the rodents themselves and from the places in which they live are collected; rodents trapped or found dead are examined for signs of disease, and recently, as a routine measure, pooled tissues of animals trapped are subjected to biological and other tests for plague. These sources of information are supplemented by other observations and experiments in the field and in the laboratory.

The colonies of the gerbille (*Taterona brantsi*) are rather widely scattered in this area and are mostly found in the open pasture veld or fallow lands, or in the vicinity of mealie threshing-floors. It is rare to find farm buildings without a colony within a hundred yards. They may be found at the edge of mealie lands, but never actually in them, except when the corn is sprouting.

Two methods of estimating gerbille numbers are in use: first, a total count made by complete trapping out and second, estimation by counts of actively worked out burrows. The basis for the second method is provided by the results of the first. It has been found that there is a fairly constant relation between the number of gerbilles and the number of burrows used during a night. It is too early yet to state whether the results so far obtained will hold good for different periods in the growth of the population, different seasons or different localities. Monthly counts of the number of active burrows in colonies marked out by a 6-ft. grid have revealed striking and so far unaccountable fluctuations. These studies have a very important bearing on the work of interpreting the past history of a colony from surface appearances when it is desired to obtain evidence of an epizootic as a cause of reduction in numbers.

To determine reproductive behaviour monthly quotas of trapped gerbilles were weighed, measured and sexed and their reproductive organs examined. No marked breeding season has been revealed, but a full year's collecting has not been completed. Accumulation of these data contributes towards an understanding of the potential and actual powers of increase of the population.

Fleas and other parasites from the gerbille quotas were collected. From September there was a gradual increase in the total number of fleas and in the proportion of gerbilles infested, until the early winter months when the numbers declined. Evidence that *Chiastopsylla rossi* increases as winter sets in and that *Xenopsylla eridos* decreases was obtained and substantiates Ingram's observations in the Free State. The other common flea on gerbilles is *Dinopsyllus ellobius*, a flea which appears to maintain its numbers fairly evenly throughout the year. *Xenopsylla braziliensis*, the prevalent flea on domestic rats has been found in rare instances only on gerbilles.

A discovery of some importance was that fleas could be collected from the entrances of burrows. Systematic collecting of fleas from entire warrens showed that fleas were distributed thinly throughout the burrow, but that they tended to be more numerous towards the centre. A flea census of a warren was made part of the monthly routine, but conclusions at this stage would be premature. The flea census gives a much more accurate picture of the flea population than that obtained from fleas taken from the rodent only, as the total number of fleas supported by a known number of gerbilles is known.

No plague infection of rodents was proved, although on a few occasions post-mortem appearances and microscopical examinations were suggestive. A dead gerbille in a warren near some Native huts where a case of plague had occurred was highly suspicious. Biological tests were made in the field, but cultures from the original animal and from those that died after scarification, and sent to the South African Institute for Medical Research for confirmation, were negative for plague.

The nematode *Capillaria hepaticola* infecting the liver has a fairly high incidence, and in certain extreme cases, when the liver was so hypertrophied that it extended to the bladder, it might be a cause of death. No other infections have so far been discovered that might cause mortality.

The amount of interchange of animals of one colony with another is unknown. In order to investigate this it is necessary to have an efficient live-trapping and marking technique. A live trap was designed which promises well and some preliminary experiments have been made in tattooing identification numbers in the ears and in ringing with numbered rings. No large scale experiments have been carried out yet.

In connection with the investigation of the domestic rat population, *R. rattus* has been found in all farm buildings that have been visited. It appears to make periodic migrations from farm to farm, but it seems probable that it is spread chiefly by motor cars and lorries. A farm rarely remains free of rats for long. All three varieties have been found, *R.r. rattus*, *R.r. alexandrinus* and *R.r. frugivorus*.

A farmstead and its outbuildings have been taken as a trapping unit. A large number of traps are concentrated until the catch falls off. In this way a high proportion of the rats are trapped and the numbers give some indication of the relative abundance on different farms. The results have shown that the degree of infestation varies considerably, and that most farms are fairly heavily infested.

Similar observations of the reproductive process as those indicated for gerbilles have been made. *R. rattus* appears to breed throughout the year and the litter-rate is high.

Xenopsylla braziliensis has proved to be the most prevalent flea in the domestic rat. Very occasionally the veld rodent fleas, *X. eridos*, *D. ellobius* and *C. rossi* have been found. This, coupled with the fact that *X. braziliensis* is very occasionally found on gerbilles, contributes to an understanding of the mechanism of plague dissemination by flea contact. *Leptopsylla segnis* and other fleas found on rats in towns have not been recorded.

The number of fleas per rat appears to be directly connected with the substrata on which the rats live. Where the floors of stores and barns, etc., are covered with loose soil and dust and debris, which provide breeding grounds for fleas, rats are heavily infested. On the other hand the flea-rate is low where the buildings have concrete floors free from dust.

Sweepings or sample collections of dust and litter from floors of outbuildings and Native huts have been taken and have often yielded a large number of fleas and larvae. The method of floor sweeping, particularly in Native huts, is a useful weapon in the investigation of an outbreak of plague, as the fleas can be tested bacteriologically by inoculating them as a suspension into guinea-pigs. It is also a rapid method of collection for a flea survey and is complementary in this respect to the method of "burrow scrapes" for collecting gerbille fleas.

No suspicious appearance on autopsy has been found and no pathogenic organisms have been isolated from specimens of *R. rattus* sent to the South African Institute for Medical Research for examination. The nematode

Capillaria hepaticola has been found, but its incidence is not as high as in gerbilles. The liver has shown only light infection and never the extreme hypertrophy seen in some gerbilles. On the whole rats have usually been in remarkably good condition, often with their organs thickly coated with fat. This may possibly be due to seasonal variations in food supply and it may be of importance in giving the animals greater resistance to infection.

Flea studies have included a flea survey, breeding experiments and an investigation of microclimates. In the flea survey intensive collections from sources in the veld and in farm buildings within a radius of about ten miles of the field station were made and provide ample material for an analysis of the flea-contact between the rodent species. The methods developed for the collection and culture of fleas can now be standardised and employed in larger scale flea surveys in the Union, and in the vital work of developing a method of establishing plague infection by means of pooled collections and in laboratory experiments. The method has been long in use by the Sylvatic Plague Committee in California, but has not yet been tested out on a large enough scale in the Union. The need for a method of obtaining large numbers of fleas in a short time for this purpose is thus to some extent served.

A convenient and simple method of providing a suitable climatic environment for breeding fleas for experimental studies was eventually worked out. A deep pit was dug and roofed over. Entrance is made along a trench and the underground chamber is shut off by a door. In the chamber the temperature shows little diurnal fluctuation and the humidity remains high. These conditions closely approximate those found to obtain in natural burrows and in an artificial burrow. Flea larvae from nests, burrow samples and floor sweepings have successfully completed their life history. Pure stocks of the commonest flea species are being maintained.

To study microclimates preliminary readings of temperature and humidity in natural gerbille burrows were made. It was found that conditions within a warren were fairly constant with a steady temperature which showed little diurnal fluctuation, and a low saturation deficiency. The observations so far made suggest that the saturation deficiency of the air in burrows is always low enough (i.e. the air is moist enough) to allow larvae to thrive and that temperature is likely to be the cause of seasonal variations in the production of fleas, as temperature controls the rate of metabolism. A comparison of air temperatures in an artificial burrow and the soil temperatures at the same depth shows that they closely approximate. At 2 feet there is practically no diurnal variation in either. The observations being carried out may show that gerbille burrow temperatures and thus the microclimate in which fleas pass their life histories may be measured simply by taking soil temperature readings.

The climatic conditions in the experimental flea breeding chamber already mentioned, closely parallel those in the artificial burrow and in nature. This knowledge permits experimental studies on the growth and natural history of the flea populations to be carried out under similar conditions to those obtaining in nature. Experiments have been planned to corroborate and elucidate field results, once the pure stocks have become well established.

A more detailed description of some of the methods that have been developed and of some of the results which are summarised above are embodied in a paper by the Ecologist.*

Anti-Rodent and Plague Measures on Railway Premises.—During November, 1938, extensive rodent mortality occurred in various areas of the Cape North System, and intensive rodent destruction measures were undertaken on all railway premises and buildings adjacent to these areas with a view to preventing the spread to railway premises. These measures met with the desired results as railway premises did not at any time become infected.

The catches of domestic rats must always be regarded as a reliable index as to the efficacy of rodent proofing. The records of catches of domestic rodents in the majority of systems this year bear this out, as they have been consistently the same for the past two years. They in turn have shown a marked decline as compared with the pre-rat-proofing period. Three systems only, viz. Cape Western, Cape Eastern and South West Africa, show any marked increase over last year's catches in domestic rodents. The records of these systems indicate, however, that the increased infestations have not occurred in any rat-proofed buildings. In the case of the Cape Western System, domestic rodent infestation is most intense in the area known as the Cape Electric area. This area is densely populated and the harbourages are innumerable. The use of wood and iron for permanent buildings in offices, yards, workshops, mess rooms, etc., cannot be too highly deprecated,

* DAVIS, D. H. S.—“On some Ecological Methods in Research on Bubonic Plague”. *S.A. Journal of Science*, 1939.

as they are usually the chief cause of trouble. The fact that in and around railway property in this vicinity reclamation work by means of refuse tipping is taking place also aggravates matters and, as usual in a seaport area, the foreshore gives shelter to numberless brown rats which find their way into buildings through sewers, down pipes, etc.

On the Cape Eastern and South West Africa systems increased catches are directly due to increased staff. In the case of the former system the staff was increased by three units and in the latter by one unit. This factor resulted in more intensive rodent destruction measures.

Further rat-proofing of goods sheds, stores and loading banks was carried out during the year. The total to date stands at 666 goods sheds completely proofed and 138 partially proofed. Additional financial provision has again been made this year. The improvement of the structural condition of buildings, floors, quays and other outside works at harbours, stations and foreshores is constantly the subject of recommendation to the various railway system managers. In the majority of new sheds erected to-day the phase of rodent proofing as part of the capital cost is included at the time of construction.

In the Cape Western System considerable improvements were effected to shedding during the current year and several new sheds were constructed. The position, to date, is:—

78 fully proofed sheds, 10 partially proofed sheds, 4 unproofed,
40 not requiring proofing.

A very small percentage of sheds, therefore, remains to be rat-proofed.

Examples of falling infestation rates after proofing can be seen on the Caledon and Bitterfontein lines, which were at one time very heavily rat-infested. To-day the sheds on these lines have not a rat in them, in spite of the fact that outside places sometimes swarm. In certain instances it has been found that, since rats have been excluded from sheds, mice have shown a tendency to increase, demanding constant trapping. The damage caused by mice is, however, negligible in comparison with that caused by rats. There being more trained staff available on this system veld rodents received more attention, and the rat-catcher was kept busy visiting those places which could not be reached by the regular health foreman owing to pressure of work.

In the Cape North System major improvements include the erection of four new goods sheds. Three of these sheds were rat-proofed as a routine. To date 73 sheds have been rat-proofed, 5 have still to be done and 5 do not require to be proofed. Minor repairs were effected by the health foreman and work is in hand for concreting two loading banks. The infestation of sheds has been slight. House mice give the greatest trouble. There has also been a marked decrease in veld rodents. Close co-operation between the Administration's health staff and co-operative societies exists on this system. In all cases where co-operative sheds on or adjacent to railway property are implicated, steps are immediately taken to have the sheds disinfected under the supervision of the health foreman.

In the Cape Midland System new sheds have been or are in the course of being constructed at Rosmead, New Bushman's River and New Brighton and Bathurst. The number of sheds still to be proofed is 27, representing 16.6 per cent. of the total. As a result of the effective proofing very few complaints have arisen as regards rodent infestation and damage to goods and foodstuffs. This fact, also, accounts for the drop in this year's catches.

Extensive improvements with regard to proofing of buildings and demolishing undesirable buildings have been carried out within the port area at Port Elizabeth during the past season. These improvements have greatly reduced the rat-infestation rate within this area.

At Mossel Bay the goods shed has been rat-proofed. When the harbour development takes place, other undesirable features will be eliminated. All concerned have been circularised concerning the proper maintenance of rat-proofing and the stacking of goods.

In the Cape Eastern System the increase in the number of rodent catches over last year's figures was due to the fact that this year there were 5 members of the staff engaged on rodent destruction as compared with 2 the previous year. Considerable improvements have been made to loading banks; 15 of these were proofed. During the past year no claims were made for goods destroyed by rodents stored in proofed sheds. The majority of rodents were destroyed in quarters, station buildings, catering stalls and in the veld. Close co-operation exists between the Administration's health staff and the port health authorities of the Buffalo Harbour.

In the Orange Free State System the proofing programme has been effective and is nearing completion. Only minor repairs require to be done. One hundred and twenty-four sheds have been proofed. The remaining 38

are in areas where proofing is not required. In spite of the intensive rodent destruction measures to prevent the spread of plague, much less cyanogas was used this year than last. The rodent population throughout the system is well under control. Proper stacking of grain still gives trouble on this system. Only by continually bringing the matter to the notice of officials at stations does it receive the desired attention.

In Natal the rodent proofing programme has progressed rather slowly. Many of the sheds have been defectively proofed. This matter is, however, receiving careful attention. As a preliminary step, a survey of all sheds has been carried out jointly by the health and works inspectors. The recommendations of these officers will shortly be brought into effect, when it is hoped that the proofing on this system will compare favourably with that on others. At Durban the newly constructed grain store and grain elevator in the Maydon Wharf area were proofed during the year and work is in hand for proofing the grain store in the Point area. The destruction of rodents in the harbour area is undertaken by the port health authorities.

In the Western Transvaal new sheds have been erected at Nancefield, Gatsrand and Luipaardsvlei during the past year and 4 sheds are under construction. To date 63 sheds have been proofed satisfactorily, 29 are partially proofed and 14 still have to be done.

In the Eastern Transvaal the rodent proofing has in the past progressed rather slowly. It received better attention during the year.

17.—RELAPSING FEVER.

An extensive outbreak of African relapsing fever among the Natives employed on a mine near Postmasburg has drawn attention to the possibilities of widespread occurrence of this disease within the Union. As its name implies, this fever is characterised by a succession of febrile attacks separated by short periods (up to ten days) during which the patient feels well but perhaps weaker than usual. The superficial resemblance to malaria, its frequent occurrence in people who probably have malaria as well, the fact that the causal organism (*Spirochaeta duttoni*) is only to be found in the circulating blood during the height of the fever and usually only in scant numbers then, are all factors which suggest that the diagnosis may very easily be missed unless the possibility is kept in mind. Moreover, probably the great majority of the sufferers are Natives who are not seen by qualified practitioners. The disease has a mortality rate of from five to ten per cent., the remainder of the cases spontaneously recovering after three or more relapses.

The infection is conveyed to man by the nocturnal bites of the tampan tick, *Ornithodoros (Argas) moubata*, which breeds and hides in the cracks and crevices of dwellings. These ticks can live up to two years without food, remain infective all their lives, and can transmit the infection to their offspring. The species is widely distributed throughout South Africa, having been recorded from every province except the Free State. Hot, rather dry and sandy localities are favourable to the tampan, which feeds on domestic animals such as the sheep and the pig and has been found on tortoises. The fowl-tampan, *Argas persica*, is a different species. Whether or not the animal hosts of this tick act as reservoirs for the infecting spirochaete of relapsing fever is unknown.

The outbreak, already referred to, at Postmasburg affords an excellent illustration of the conditions under which this disease may assume epidemic proportions and of the serious economic losses which may follow upon defective housing of labour forces. Dr. Ordman of the South African Institute for Medical Research, Johannesburg, who investigated this outbreak, estimates that during a period of eighteen months there were some 1,800 cases, with a mortality rate of about nine per cent. Cases occurred throughout the year, but the incidence was highest during the summer months, at one period over fifteen per cent. of the Native labourers being invalided. The brick walls and clay floors of the compound sleeping quarters showed numerous crevices, and contained hundreds of tampan.

The prevention of the disease in Native dwellings depends, as has long been recognised by sanitarians, solely on "building out the tick" by means of a smooth surface concrete finish to all floors and walls; and employers of labour in areas liable to tick-infestation would do well to take practical steps to eliminate the possibility of outbreaks similar to that at Postmasburg. During the year the Department has received samples of tampan-ticks collected from a Native compound in the Eastern Transvaal; and tampan have also been collected from Native huts near Nqutu, which is not far removed from the coal mining areas of Northern Natal.

The occurrence of relapsing fever within the Union was recorded as far back as 1912 by an officer of this Department, Dr. Park Ross, who found cases in Zululand. Recently cases have been reported by practitioners in the Northern Transvaal, notably by the district surgeons at Messina (Dr. le

Helloco) and Louis Trichardt (Dr. Kirk-Cohen). Some of their cases probably acquired the infection in Rhodesia or Nyasaland, where it is common, but there is every reason for believing that certain districts in the Northern Transvaal are endemic foci. With the vector as widespread as it is in South Africa, it would appear to be a matter of considerable public health importance to guard against the importation of cases among the labour recruits entering the Union from the north, particularly those who are accommodated in compounds affording harbourage for ticks. Cases brought to the Reef are less likely to cause outbreaks, owing to the high standard of housing provided on mine compounds.

The Department's Senior Malaria Officer at Tzaneen reports the occasional occurrence of spirochaetes of relapsing fever in smears taken for the diagnosis of malaria. As has been pointed out, the organisms only appear in the blood for relatively short and infrequent intervals during the whole course of the illness, so that probably the actual number of cases is higher than is indicated by the number of blood smears, taken without the specific object in view, which prove positive. Several practitioners and lay people in various parts of the country have stated that they are aware of the presence of "tick fever" in their respective districts, but it should be borne in mind that the diagnosis can only be securely established by the examination of blood smears. It should be noted that "tick-bite fever", to which reference is made in the Typhus section of this report, is another disease altogether.

18.—SLEEPING SICKNESS.

In November, 1938, the Johannesburg Municipality reported to the Department the discovery of a case of sleeping sickness in a Native male. This Native coming from Maun, Northern Bechuanaland, had sought work on the mines. Apparently a period of six weeks elapsed after his arrival before he reported ill.

A further case, in this instance a European woman, was reported in Pretoria in December. This woman had actually developed her condition while at Maun.

These notifications were immediately transmitted to the Bechuanaland Protectorate Administration. Full information has continued to be exchanged between the Principal Medical Officer of the Protectorate and this Department.

These two cases have been reported in detail in the medical literature.* It emerges that human trypanosomiasis has appeared in a strip of "fly" country near Maun in the northern part of British Bechuanaland. This is the furthest south that the disease has yet appeared. The trypanosome in morphology and pathogenicity resembles *T. rhodesiense*. Flies obtained from the area have been identified as *Glossina morsitans*.

These discoveries add to the importance and interest of the findings reported by W. A. Lamborn in 1935. Dr. Lamborn in that year could find no confirmation of the existence of sleeping sickness in the southern part of the fly area of the Okovango swamp of Ngamiland, but did discover evidence of it in the northern area. The occurrence of human trypanosomiasis in these areas is doubly of concern to the Union as there is a traffic of Natives from Bechuanaland seeking work in the Union, and of European shooting parties from the Union to the Protectorate. It is a pleasure to record that the Protectorate Administration is co-operating fully in the exchange of information, and is making special investigations to determine the exact extent of the endemic area.

19.—SMALLPOX.

The large number of cases, viz. 408 with 3 deaths, represents the continuation of the epidemic which commenced in June of 1937. This was discussed in detail in the report of last year. The period covered by the present report saw the decline of the previous extensive prevalence of the disease. Cases in decreasing numbers continued to appear in July, August, September and October in the areas severely affected at the height of the epidemic, viz. Pietersburg, Louis Trichardt and Letaba districts of the Northern Transvaal and the Reef area. The months November, December and January, 1939, were practically normal in the incidence of smallpox; but a flare-up on the Reef in February, when cases appeared in Johannesburg, Benoni, and Alexandra Township was traced to a source in the Native Township of Evaton. This community lies a short distance north of Vereeniging, and in spite of attempts by this Department, has not yet come under local government, suffering consequently from a lack of facilities for

* (1) A Case of Sleeping Sickness from Bechuanaland.—M. J. Broderick and A. Pyper, *S.A. Med. Journal*, 1939. Vol. XIII, p. 127.

(2) Laboratory Examination of two cases of Trypanosomiasis contracted in Bechuanaland—By J. H. S. Gear and B. de Meillon, *S.A. Med. Journal* 1939 Vol. XIII p. 233.

discovering and dealing with outbreaks of infectious disease. In this particular outbreak it was discovered that numbers of cases of mild smallpox had existed at Evaton prior to discovery consequent upon secondary cases occurring in Vereeniging and on the Reef. By instituting mass vaccination in Evaton and the surrounding communities the Department was successful in preventing a major spread.

TABLE 26.—SMALLPOX CASES AND DEATHS DURING PAST SIX YEARS.

Year ending 30th June.	Cases.	Deaths.
1934.....	29	1
1935.....	29	—
1936.....	24	6
1937.....	27	1
1938.....	653	7
1939.....	408	3

TABLE 27.—SMALLPOX: CASES AND DEATHS REPORTED DURING THE YEAR ENDED 30TH JUNE, 1939.

Province.	Number of Districts in which Outbreaks Occurred.	European.		Non-European.		Total.	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cape.....	7	—	—	8	—	8	—
Natal.....	5	—	—	29	—	29	—
Orange Free State.....	4	1	—	10	1	11	1
Transvaal.....	13	6	—	354	2	360	2
UNION.....	29	7	—	401	3	408	3

A further aftermath of the epidemic of last year was the appearance at irregular intervals throughout the year of small groups of cases in the Northern Transvaal in the Pietersburg and Letaba districts. In spite of the previous extensive vaccination campaigns it was discovered in dealing with the later Northern Transvaal outbreaks that many communities in the more remote and inaccessible districts had not been vaccinated. Further extensive vaccination has been undertaken by the district surgeons of Pietersburg and Blaauwberg.

As with the earlier phases of the epidemic the disease remained mild in form.

Tables 28 and 29 give the vaccination records for the year under review.

TABLE 28.—VACCINATION OF INFANTS AND CHILDREN IN THE CLASSES OF THE POPULATION WHICH REGISTER BIRTHS, YEAR ENDED 30TH JUNE, 1939.
(These figures do not include Re-vaccination of the 12-year old Children.)

Particulars.	Cape.		Transvaal.		Natal.			Orange Free State.	Union.
	Cape District.	Remainder of Province.	Rand Area.	Remainder of Province.	Durban.	Pietermaritzburg.	Remainder of Province.		
Births entered in Vaccination Register.....	13,483	41,510	14,853	12,351	2,918	755	1,719	4,825	92,414
Successfully vaccinated.....	5,468	3,955	3,673	4,146	1,333	473	879	2,439	22,366
Insusceptible to vaccination.....	4	38	51	35	65	14	23	12	242
Vaccination postponed owing to illness.....	119	571	658	722	390	99	271	748	3,578
Previously had smallpox.....	2	—	—	—	—	—	—	—	2
Deaths of infants under two years registered.....	3,261	4,840	837	593	221	63	122	193	10,130
Exempted under Section 10, Act No. 15 of 1928.....	26	65	143	112	171	23	40	55	635

TABLE 29.—RE-VACCINATION OF TWELVE-YEAR-OLD EUROPEAN CHILDREN IN NATAL, YEAR ENDED 30TH JUNE, 1939.

Particulars.	Durban.	Pieter-maritzburg.	Remainder of Province.	Total.
Registration of twelve-year-old European Children.....	1,574	463	1,334	3,371
Successfully vaccinated.....	885	280	959	2,124
Insusceptible to vaccination.....	128	81	171	380
Vaccination postponed owing to illness....	32	12	31	75
Previously had smallpox.....	—	—	—	—
Due for re-vaccination but previously exempted under Act No. 15 of 1928.....	75	10	33	118

20.—TUBERCULOSIS.

The year under review has marked a further advance in the fight against tuberculosis in South Africa. On the 23rd January, 1939, a small committee consisting of officers of the Departments of Public Health and Agriculture, to which the Medical Officers of Health for the City of Capetown and the Divisional Council of the Cape were invited, met at the offices of the Union Health Department, Capetown. Various aspects of the tuberculosis problem were considered and it was decided to have further meetings under the chairmanship of Dr. Peter Allan, Deputy Chief Health Officer, Capetown.

A conference under the chairmanship of the Secretary for Public Health, to which medical men and delegates from social and municipal organisations were invited, was held for two days—6th and 7th February, 1939—at the City Hall, Capetown. The Secretaries of the Departments of Social Welfare and Native Affairs were present and much valuable work was done. The Secretaries of the various State Departments answered many questions and the delegates contributed a considerable amount of information and put forward the difficulties they were experiencing in dealing with the tuberculosis problem. All who attended felt that the conference had been most useful and the view was expressed that further similar conferences should be held to consider the position at a later date. The Department appreciates the interest of the delegates and the helpful criticisms which they offered.

Owing to the fact that notification is incomplete even for Europeans and to a much greater degree for non-Europeans, it is useless to tabulate statistics of the incidence of tuberculosis from the notifications received. These notifications have increased by over 300 per cent. during the years 1920 to 1937. In 1920, 3,313 cases of tuberculosis were notified in the Union, 349 being in Europeans and 2,964 in non-Europeans. In 1937 the number of cases was 10,511—712 Europeans and 9,799 non-Europeans were notified. It can definitely be stated that this increase in notifications does not indicate a corresponding increase in the number of persons affected. With increasing facilities for diagnosis and treatment it would appear that notifications are much more complete than they were in former years.

A comparison of the death rates and notification rates shows that notifications are still very incomplete, as the death rates exceed the notification rates over a period of years. For instance, in 1935 the notification rate was 37·7 per 100,000 Europeans in the Union, and the death rate was 40·43 per 100,000.

That the number of deaths from tuberculosis has not increased among Europeans in the seven years 1930-1936 is shown in the following table:—

TABLE 30.—TUBERCULOSIS: DEATHS DURING SEVEN YEARS, 1930-1936.

	1930.	1931.	1932.	1933.	1934.	1935.	1936.
Pulmonary Tuberculosis.....	614	572	568	601	578	587	517
Tuberculosis Meningitis.....	43	40	55	35	40	53	34
Other Tuberculosis diseases.....	61	55	64	54	52	70	57
Miner's Phthisis with Tuberculosis	123	142	100	79	87	88	83
TOTALS.....	841	819	787	769	757	798	691

Since 1912 there has been a steady decline in the European death-rate from tuberculosis. The standardised death-rate in Europeans from all causes has not varied very considerably over a period of years. In 1921 it was 11·43 per 1,000 of the European population and in 1939, 9·50 per 1,000. During the same period the death-rate from tuberculosis (all forms) fell

from 0·58 per 1,000 to 0·36 per 1,000. The fall in the tuberculosis death-rate has been most marked in the later 10 years, dropping from 50·95 per 100,000 in 1928 to 36·40 per 100,000 in 1937. As far as Europeans are concerned it appears from all the information available that tuberculosis is definitely decreasing in the Union and it is confidently hoped that the incidence will continue to fall.

Statistics regarding non-Europeans are extremely inadequate; but from the information at our disposal it is known that tuberculosis is taking a terrible toll of non-European lives.

The Coloured population of the Union was 769,661 at the 1936 census. In 1937, 2,828 Coloured persons died of tuberculosis. In other words, one Coloured person out of every 272 dies annually of tuberculosis as compared with one European out of every 2,899. The tuberculosis death rate in Coloured people is more than *ten* times that among Europeans in the Union.

It is impossible to state whether the death-rate for Coloured people is rising or falling in the Union as a whole. Statistics are, however, available for the City of Capetown. The population of Capetown is, Europeans 153,640, non-Europeans (excluding the Native Location of Langa) 142,470. During the year ended 30th June, 1937, there were 84 deaths from tuberculosis in Europeans and 595 deaths in non-Europeans—equal to death-rates of 0·55 per 1,000 of the European citizens and 4·18 per 1,000 non-European citizens. The death-rates in 1914-15 were: Europeans 1·11 per 1,000 and non-Europeans 5·09 per 1,000. For the year ended 30th June, 1939, the rate in both sections of the community had fallen to 0·82 for Europeans and 4·76 for non-Europeans. The lowest rates recorded were in 1936-37 when the European rate was 0·55 which is exactly half that of 1·11 the highest rate in 1914-15. The lowest non-European rate was 4·10 in 1920-21, while the highest was 5·48 in 1931-32. Thus it would seem that the non-European rate in Capetown has varied over a period of 23 years without any definitely marked fall.

In the country districts of the Western Province medical men state that tuberculosis among Coloured people is on the increase; but no comprehensive figures are available.

The remarks of the Medical Officer of Health for Upington regarding tuberculosis in his annual report for 1938-39 are typical of the views of many doctors:—

“ All 14 cases were among the Coloured and with 12 deaths this year the disease is making very severe inroads upon them as there is a definite increase of the number afflicted this year compared with, say, 10 years ago. Direct contact is the cause of spread in all cases.”

In the same report the Medical Officer of Health calls attention to the housing conditions of the Coloured people in Upington which he regards as favouring the spread of tuberculosis. During the year ended 30th June, 1939, there were 12 deaths from pulmonary tuberculosis—all of Coloured people. There were no deaths from this disease among the 2,401 Europeans. There are 6,735 Coloured people in Upington; the 12 deaths represent a rate of 1·7 per 1,000. During the year there were 7 cases of enteric fever notified; of these 2 died.

Clinically the type of tuberculosis affecting Coloured people is the same as in Europeans. When the curves of the death-rates at age periods are compared the percentage of deaths from tuberculosis at the various age periods is similar. For males both European and Coloured the peak is reached in the 45-50 group, while the peak in the females is in the 25-30 age group. It would appear, therefore, as if some definite factors must account for the abnormally high incidence of tuberculosis amongst Coloured people.

In England at the beginning of the industrial era tuberculosis was much more prevalent than it is to-day. This can to a certain extent be attributed to changes in the mode of life of the people. Within comparatively recent times tuberculosis appeared in epidemic form among the Indians of the Canadian prairies when they were forced to abandon their nomadic life. These factors do not enter into the case of the Coloured people of South Africa. The reasons for the abnormal incidence would therefore seem to be due to:—

- (1) unusually high exposure to infection;
- (2) conditions of living which are conducive to infection; and
- (3) lack of resistance probably to a large extent due to malnutrition.

It must be pointed out that the Coloured people have not so far been able to get the treatment which the European section of the population has enjoyed. In the larger towns this state of affairs is being rapidly

remedied, and in the country districts schemes are being considered to provide hospital and sanatorium treatment for all sections of the population.

The isolation of the advanced case which, in unsuitable surroundings, is a source of great danger to other members of the family, is thus being ensured. The clinic system is being encouraged and several of the smaller towns are contemplating clinics. There is every confidence that as the scheme develops the problem of tuberculosis among Coloured people will be brought under control.

Tuberculosis in Natives in the Transkei.

At the 1926 census the Native population of the Transkei was 1,154,378 of whom 19,356 were living in urban areas. In 1938 a total of 87,064 Native males was recruited for work on the gold mines and during that year 190 were reported to be suffering from tuberculosis. During the year 1st July, 1938 to 1st June, 1939—

(a) 3,043 cases of tuberculosis (all forms) were notified by medical practitioners;

(b) 169 cases of pulmonary tuberculosis were reported from the mines.

While it is realised that notification of tuberculosis in Natives in the Transkei is very incomplete, we know that the incidence is at least 2·63 per 1,000.

In Port Elizabeth in 1938 there were 240 cases of tuberculosis (all forms) notified in a Native population of 18,260, equal to an incidence rate of 13·14 per 1,000.

In Bloemfontein the rate was 1·40 per 1,000 for the same year.

The following report by Dr. Rijno Smit, Medical Inspector, Transkeian Native Territories, is interesting:—

“ I investigated 184 notified cases of tuberculosis and 101 suspected cases in six areas in the Transkei. Of the 184 notified cases 42 were dead and 42 could not be traced. Out of the 201 persons examined, 78 were found to have clinical signs of pulmonary tuberculosis, 85 had glandular tuberculosis and 32 had tuberculosis of bones. The sputum contained *Tubercle bacilli* in 11 of the 78 cases of clinical pulmonary tuberculosis. The population of the 5 locations investigated was 14,523 ”.

Tuberculosis in Natal.

In Natal Dr. Dormer considers that the types of tuberculosis are different from those in other parts of the Union, the tuberculosis occurring in the Indian resembling the European type, whereas the tuberculosis in the Coloured people in Natal approximates more to the type affecting the Native in that province. He gives the following figures in respect of Natal:—

European population in 1936	190,551
Death-rate from tuberculosis	0·30 per 1,000
Coloured population	18,513
Death-rate from tuberculosis	3·14 per 1,000

Dr. Dormer examined 27,000 Natives in Natal, on which he reported as follows:—

In reserves untouched by European civilisation the death-rate from tuberculosis is	0·25 per 1,000
Near towns the rate rises to	0·66 per 1,000
In semi-urban areas the rate is	1·105 per 1,000
In urban areas the rate is	2·0 per 1,000

Tuberculin tests on Natives in Natal near towns showed positive reactions in 50 per cent. of those tested.

This is definitely lower than the percentages obtained by Dr. Allan in the Transkei, where it was found that in the coastal areas 74 per cent. of the Native population of all ages were positive reactors to the tuberculin test and in Natives over 25 years of age the percentage was over 90 per cent. positive. Many cases of tuberculosis among Natives in the Transkei were of the modified form and comparable to many cases seen in Europeans.

The reports from Natal show a very different picture from that found in the Transkei ten years ago.

During six months in 1929, 132 Native tuberculotics were admitted to the Addington Hospital (Durban). In 1936 the number was 454 and in 1937 the numbers admitted to the King Edward VIII Hospital (Durban) reached the 1,000 mark. In his report for the year 1938-39 the Medical

Superintendent of the King Edward VIII Hospital states that during that year the following Native cases of tuberculosis were admitted to the hospital:—

Pulmonary tuberculosis 720 admitted, of whom 370 died.

Other forms of tuberculosis, 170 admitted, of whom 75 died.

He remarks as follows on these figures:—

“ It must be emphasised that this appalling mortality rate is due to two factors:—

- (a) the very feeble natural immunity of the non-Europeans to this disease, and
- (b) sheer under-nutrition found invariably among the unfortunate paupers who form the great bulk of our cases ”.

The tuberculosis position in Natal has apparently altered in the past twenty years. In the Report of a Tuberculosis Survey of the Union of South Africa by Dr. Peter Allan published in 1924 (U.G. 18—24) statistics for the Borough of Durban are given for the years 1903 to 1920. During that period the highest death-rate from tuberculosis in Natives in Durban was recorded for the year 1906-7 when the death-rate was 2·2 per 1,000. The tuberculosis death-rate declined rapidly and in 1911-12 it was 0·27 per 1,000 and again the same in 1914-15; but from that date it began to rise and again was 0·52 per 1,000 in 1919-20 and had reached 2·30 per 1,000 in 1936-37.

Contrast this state of affairs with the tuberculosis position in Indians in Durban. The highest tuberculosis death-rate since 1903 was recorded in 1907-8 when it was 5·1 per 1,000. The death-rate then fell steadily and in 1919-20 it was 1·42 per 1,000. The reasons given for this fall as given in 1922 were—

- (1) repatriation of unfit Indians;
- (2) deaths of old cases;
- (3) improved hygienic conditions;
- (4) cessation of importation of “ coolie ” labourers in 1911.

In 1936 the death-rate from tuberculosis in Asiatics in Durban was 1·39 per 1,000.

European death-rate from tuberculosis in Natal.—In 1912 the death-rate from tuberculosis was highest in Natal being 0·75 per 1,000 as against the death-rate for the whole Union of 0·50. In 1937 the rate in Natal was 0·36 per 1,000 being slightly less than the average for the whole Union.

Tuberculosis in Large Towns in the Union.

Cape Province.—Reference has already been made to the position in Capetown.

Port Elizabeth.—In his report for the year ended 30th June, 1938, the Medical Officer of Health gives the following particulars:—

TABLE 31.—NOTIFICATIONS OF TUBERCULOSIS IN PORT ELIZABETH.

Type of Disease.	European.	Eur-african.	Asiatic.	Native.	Total.
Pulmonary Tuberculosis.....	98	269	7	236	610
Tuberculosis Meningitis.....	—	5	2	3	10
Tuberculosis Spine.....	1	2	—	1	4
Abdominal Tuberculosis.....	—	2	—	—	2
TOTALS.....	99	278	9	240	626

This is an increase of 78 notifications as compared with the previous year, namely, Europeans 1, Euraficans 43, and Natives 39, while the Asiatic notifications had decreased by five.

TABLE 32.—DEATHS FROM TUBERCULOSIS IN PORT ELIZABETH.

Type of Disease.	European.	Eur-african.	Asiatic.	Native.	Total.
Pulmonary Tuberculosis.....	36	108	11	136	291
Tuberculosis of Nervous System.....	1	10	2	8	21
Other Tuberculosis Diseases.....	—	8	1	6	15
TOTALS.....	37	126	14	150	327

The death-rates for the past two years were:—

	Year ended 30/6/37.	Year ended 30/6/38.
Europeans.....	1·14	0·68
Eurafricans.....	6·24	4·86
Asiatics.....	4·31	4·11
Natives.....	8·88	7·50

In 1920 the European death-rate from tuberculosis was 0·63 and for all non-Europeans 5·16 per 1,000.

East London.—The death-rates for two years were as follows:—

	Year ended 30/6/36. per 1,000	Year ended 30/6/37. per 1,000
Europeans.....	0·18	0·18
Coloureds.....	9·10	8·50
Natives.....	5·01	5·01
Asiatics.....	1·20	—

In 1937 there was no death from tuberculosis among the 814 Asiatics in East London. In 1932 the death-rate from tuberculosis among Europeans was 0·35 per 1,000 and for all non-Europeans 3·7 per 1,000. For the year ended 30th June, 1938, the European rate was 0·3 and all non-Europeans 5·06 per 1,000.

Transvaal.—The death-rates from tuberculosis in Johannesburg and Benoni are shown:—

JOHANNESBURG.

Death-rates from Tuberculosis for the year ended 30th June, 1936.

Europeans	0·23 per 1,000
Natives	1·15 per 1,000
Coloureds	2·04 per 1,000
Asiatics	1·02 per 1,000

BENONI.

Death-rates from Tuberculosis for the year ended 30th June, 1937.

Europeans	0·14 per 1,000
Natives (Mines)	0·38 per 1,000
Natives (Locations)	2·33 per 1,000
Coloureds	0·52 per 1,000
Asiatics	1·04 per 1,000

AVERAGE FOR PERIOD: 1931-36.

Europeans	0·26 per 1,000
Natives (Mines)	0·38 per 1,000
Natives (Locations)	1·90 per 1,000
Coloureds	2·07 per 1,000
Asiatics	0·63 per 1,000

Orange Free State.—The death-rate from tuberculosis among Europeans in the Orange Free State has always been much lower than in the other provinces. In 1912 it was 0·29 per 1,000. In 1937 it had dropped to 0·14.

Statistics are available for Bloemfontein for Europeans and non-Europeans since 1927; in 1938-39 the death-rates were as follows:—

	European.	Non-European
Pulmonary Tuberculosis.....	0·32	2·42
Other Forms.....	0·08	0·34

Institutional Accommodation for Cases of Pulmonary Tuberculosis.—The following table shows the number of beds available for cases of pulmonary tuberculosis:—

TABLE 33.—TUBERCULOSIS: AVAILABLE ACCOMMODATION.

Province.	Europeans.	Non-Europeans.
<i>Transvaal.</i>		
Springkell Sanatorium.....	124	—
Rietfontein.....	—	47
<i>Orange Free State.</i>		
Tempe Hospital.....	20	20
<i>Natal.</i>		
King George V Hospital.....	35	104
<i>Cape.</i>		
Nelspoort Sanatorium.....	102	72
Capetown.....	104	84
Stellenbosch.....	5	25
Port Elizabeth.....	36	36
Qumbu (Transkei).....	—	20
TOTALS.....	426	408

In addition many cases of tuberculosis among non-Europeans are treated in small isolation hospitals such as those at Paarl and Malmesbury; many Natives are also treated in mission hospitals. As already stated 720 cases of pulmonary tuberculosis and 170 cases of tuberculosis other than pulmonary were admitted to the King Edward VIII Hospital Durban, in 1938. At Holy Cross Mission Hospital, Flagstaff, 110 cases of tuberculosis, of which 66 were pulmonary disease, were treated in 1938.

There is always a large number of Natives suffering from tuberculosis in the Victoria Hospital, Lovedale, and a special section of 100 beds for tuberculosis is in course of construction at Lovedale.

A new infectious diseases hospital is in course of erection at Umtata where accommodation will be provided for 30 tubercular patients.

At East London cases of tuberculosis both among Europeans and non-Europeans are treated in the Infectious Diseases Hospital.

A site has been bought for a new tuberculosis hospital sanatorium of 200 beds near Capetown to serve that City.

A site has been selected at Worcester for an infectious diseases hospital in which tubercular cases from the surrounding districts can be treated.

The position in Beaufort West is being investigated with a view to providing accommodation for cases of tuberculosis.

Several other municipalities have been considering the question of providing beds for tuberculotics.

Within the next two years there will be over 1,200 beds in the Union for cases of pulmonary tuberculosis.

Tuberculosis is an infectious disease occurring chiefly among the malnourished. While the provision of isolation accommodation is very important it is not going to solve the problem. The incidence of the disease is largely influenced by economic conditions. In times of prosperity the death-rate is low, and in times of economic depression the rate rapidly rises. Adequate nutrition and suitable housing are essential considerations in tackling the problem of tuberculosis, which is to a large degree a preventable disease.

The cases notified during the year are shown in Table 34 and are seen to total 13,171, as compared with last year when the number of cases was 12,338.

TABLE 34.—TUBERCULOSIS: NOTIFICATIONS DURING THE YEAR ENDED 30TH JUNE, 1939.

Province.	European.	Non-European.	Total.
Cape (excluding Transkei).....	559	4,819	5,378
Transkei.....	3	3,392	3,395
Transvaal.....	200	2,158	2,358
Natal.....	153	1,634	1,787
Orange Free State.....	35	218	253
UNION.....	950	12,221	13,171

The death-rates from tuberculosis for Europeans in the Union from 1912 onwards are shown in Table 35.

TABLE 35.—DEATH RATES FROM TUBERCULOSIS PER 100,000 OF POPULATION—EUROPEANS ONLY.

Year.	CAPE.			NATAL.			TRANSVAAL.			ORANGE FREE STATE.			UNION.		
	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.
1912.....	70.55	44.83	58.11	85.84	62.66	75.03	55.97	26.97	43.14	29.58	28.09	28.89	61.10	38.32	50.49
1913.....	70.19	53.93	62.31	81.15	52.19	67.60	57.61	22.43	41.88	29.54	24.13	27.02	61.21	39.67	51.13
1914.....	60.82	40.27	50.85	83.59	32.85	59.80	57.60	25.42	43.08	28.44	14.31	21.81	57.26	31.39	45.10
1915.....	56.42	40.43	48.64	69.37	33.52	52.52	60.69	21.73	42.95	19.98	25.92	22.78	54.26	31.76	43.63
1916.....	42.31	44.91	43.58	75.22	35.95	56.72	72.37	33.91	54.71	27.30	16.30	21.99	53.91	36.77	45.78
1917.....	64.12	51.27	57.53	66.75	38.21	53.28	70.23	22.42	48.09	37.75	16.12	27.44	63.18	35.55	50.02
1918.....	52.07	39.25	45.81	64.87	46.97	56.39	76.62	21.28	50.80	37.65	18.20	28.33	60.24	31.06	46.28
1919.....	41.56	49.23	45.32	57.63	30.66	44.73	82.21	13.39	49.82	43.60	12.37	28.61	57.95	30.55	44.77
1920.....	52.55	39.07	45.94	73.70	43.50	59.14	72.91	19.73	47.70	45.30	17.79	32.08	60.92	30.07	46.00
1921.....	36.99	64.06	60.48	74.93	24.00	50.21	102.08	22.70	64.22	54.13	23.12	39.20	74.65	40.87	58.26
1922.....	61.70	55.91	58.84	35.64	11.54	23.90	75.78	22.41	50.24	20.07	19.52	19.81	59.27	35.56	47.74
1923.....	55.03	52.43	53.74	41.62	40.45	41.05	74.45	21.12	48.77	19.91	17.17	18.59	56.53	35.91	46.46
1924.....	67.04	52.82	60.00	50.93	36.38	43.77	84.54	23.41	55.01	14.71	22.25	18.33	65.47	37.08	51.59
1925.....	65.65	62.14	63.91	73.89	40.51	57.42	74.27	21.84	48.87	30.01	12.59	21.65	65.19	39.68	52.70
1926.....	58.97	57.36	58.18	49.23	39.85	44.64	95.54	24.41	61.09	24.89	16.22	20.68	67.29	38.90	53.41
1927.....	61.36	59.87	60.62	71.95	28.73	50.78	78.78	17.87	49.20	24.58	12.98	18.94	64.30	36.10	50.50
1928.....	60.72	56.51	58.64	54.99	25.55	40.56	85.08	20.74	53.75	31.76	15.74	23.96	65.61	35.69	50.95
1929.....	57.98	51.63	54.85	44.58	22.56	33.78	72.48	18.08	45.95	22.16	17.47	19.87	57.70	32.54	45.37
1930.....	62.20	50.58	56.46	51.74	31.51	41.81	73.84	18.96	47.09	23.47	6.87	15.36	61.05	31.96	46.78
1931.....	55.79	55.75	55.77	54.26	26.34	40.54	64.26	15.05	40.33	24.81	11.92	18.49	55.41	32.62	44.22
1932.....	51.02	54.55	52.77	58.63	24.66	41.92	59.19	16.40	38.37	20.02	15.83	17.96	51.49	32.84	42.33
1933.....	57.48	54.40	55.95	46.86	18.64	32.96	52.21	14.58	33.88	22.86	6.90	15.01	50.60	30.44	40.68
1934.....	50.85	50.23	50.54	50.31	26.97	38.81	52.30	16.50	34.85	19.03	12.77	15.95	47.93	30.88	39.54
1935.....	50.85	56.52	53.68	43.39	28.72	36.07	49.18	16.83	33.54	14.63	26.16	20.31	45.76	34.93	40.43
1936.....	46.61	44.72	45.67	45.03	15.69	30.35	45.28	12.57	29.49	18.65	9.08	13.93	43.12	25.40	34.40
1937.....	47.19	50.17	48.68	44.56	27.78	36.14	42.82	16.39	30.07	13.74	15.14	14.43	41.82	30.82	36.40
1938.....	54.90	51.74	53.32	60.45	28.28	44.25	42.42	13.54	28.50	18.65	11.10	14.93	46.57	29.86	38.34

Prior to 1921 certified deaths only were included.

M. = Males; F. = Females; P. = Persons.

Nelspoort Sanatroium.

This institution caters for free, part-paying and full-paying patients. During the past year the average daily number of patients was:—

Europeans	102·3
Coloureds	43·2

The average length of stay was 179 days for Europeans and 116 days for Coloureds. The number of patients admitted during the year was 184 Europeans and 133 Coloureds. These patients were admitted in the following stages of the disease:—

TABLE 36.—CONDITION OF PATIENTS ADMITTED TO NELSPOORT SANATORIUM, YEAR ENDED 30TH JUNE, 1939.

	CONDITION OF PATIENTS ADMITTED.			
	T.B. Minus Group.	T.B. Plus Group.		
		Stage I.	Stage II.	Stage III.
Europeans.....	8	29	99	48
Coloureds.....	8	18	54	53
TOTAL.....	16	47	153	101
Percentage.....	5·2	14·8	48·2	31·8

In Table 37 are shown the numbers of patients admitted to and discharged from the institution and the number of deaths during the year.

TABLE 37.—ADMISSIONS, DISCHARGES AND DEATHS AT NELSPOORT SANATORIUM, YEAR ENDED 30TH JUNE, 1939.

	Total.	European.			Coloured.		
		M.	F.	T.	M.	F.	T.
In Sanatorium on 1/7/38.....	127	49	50	99	18	10	28
Admitted during year.....	317	96	88	184	104	29	133
Died during year.....	20	3	4	7	5	8	13
Discharged during year.....	264	95	87	182	69	13	82
In Sanatorium on 30/6/39.....	160	47	47	94	48	18	66

M. = Male. F. = Female. T. = Total.

21.—TYPHUS OR RICKETTSIOSIS.

Three types of rickettsioses are recognised as occurring in the Union. These are Louse-borne or “ Epidemic ” Typhus, Rat-Flea Typhus, and Tick Typhus or “ Tick-bite Fever ”. The bacteriological and immunological relationships of these diseases are the subject of current investigations in this and in other countries. From the point of view of preventive medicine the three types are distinct.

Louse-borne Typhus is endemic in the Union, and Tables 38, 39 and 40 indicate its prevalence. It is a disease associated with poverty, malnutrition, overcrowding and poor standards of personal hygiene. Man himself is the reservoir of the disease, and it is conveyed from man to man by the louse and in no other way. The eradication of typhus thus depends upon the carrying out of a programme of improved nutrition, sanitation, and health education, particularly in the Native areas which are chiefly affected by the disease. Meanwhile, the suppression of constant outbreaks, on farms and in Native kraals, which otherwise might rapidly assume epidemic proportions, depends on the vigilance and activity of the deverminising staff maintained by this Department in the areas principally affected. The disease was particularly prevalent in the Transkeian Territories during the early winter months of 1939. In the Lusikisiki district alone seventy deaths were reported in one week. The typhus occurring in South Africa is not as virulent as it is in many other parts of the world, some authorities indeed having questioned whether it really is the same disease; the deaths among Natives are a reflection rather of their mal-nourished condition and inadequate nursing services than of the virulence of the disease itself.

TABLE 38.—REPORTED CASES AND DEATHS OF TYPHUS IN THE PROVINCES OF THE UNION SINCE 1923, FOR YEARS ENDING 30TH JUNE.

Year.	CASES.					
	Cape.	Natal.	O.F.S.	Transvaal.	Union.	Deaths.
1923.....	6,118	356	425	200	7,099	755
1924.....	1,392	241	286	203	2,122	382
1925.....	579	218	220	127	1,144	163
1926.....	701	87	272	75	1,135	146
1927.....	638	72	168	17	895	136
1928.....	1,154	91	68	18	1,331	208
1929.....	1,320	65	84	11	1,480	193
1930.....	1,564	57	149	12	1,782	212
1931.....	869	62	53	557	1,541	261
1932.....	1,263	51	40	196	1,550	292
1933.....	1,649	208	243	25	2,125	302
1934.....	1,905	207	3,636	208	5,956	662
1935.....	2,898	224	3,275	429	6,826	998
1936.....	835	33	280	457	1,605	284
1937.....	694	89	178	46	1,007	168
1938.....	822	19	88	53	982	168
1939.....	1,067	81	32	93	1,273	424

TABLE 39.—TYPHUS NOTIFICATIONS AMONG EUROPEANS IN THE UNION SINCE 1923, FOR YEARS ENDING 30TH JUNE.

Year.	Cape.	Natal.	O.F.S.	Transvaal.	Total.	
					Cases.	Deaths.
1923.....	39	3	8	6	56	6
1924.....	26	8	10	2	46	3
1925.....	13	19	2	3	37	—
1926.....	22	25	6	2	55	1
1927.....	13	21	4	1	39	2
1928.....	18	30	3	1	52	—
1929.....	27	17	1	—	45	—
1930.....	34	33	2	5	74	5
1931.....	26	21	3	3	53	2
1932.....	25	7	1	—	33	2
1933.....	43	9	1	1	54	3
1934.....	23	10	12	—	45	3
1935.....	38	16	29	14	97	5
1936.....	20	13	3	4	40	2
1937.....	27	5	2	2	36	6
1938.....	20	8	4	5	37	1
1939.....	13	9	4	1	27	3

TABLE 40.—TYPHUS FEVER: CASES AND DEATHS REPORTED DURING THE YEAR ENDED 30TH JUNE, 1939.

Province.	Number of Districts in which Outbreaks Occurred.	European.		Non-European.		Total.	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cape.....	36	13	1	1,054	386	1,067	387
Natal.....	11	9	—	72	10	81	10
Orange Free State.....	12	4	1	28	3	32	4
Transvaal.....	5	1	1	92	22	93	23
UNION.....	64	27	3	1,246	421	1,273	424

Rat-flea or Murine Typhus is not an infectious disease in the usual sense, but may almost be regarded as an occupational disease. Rats are the reservoirs of infection, and human cases occur among warehousemen and others whose work brings them into contact with fleas which have deserted the bodies of rats dead from the disease. This type of typhus is usually more mild than ordinary typhus.

Tick Typhus is now recognised as being of considerable importance to the public health. Infection is conveyed to man by the bite of ticks—"hard-bodied" ticks as distinguished from the soft-bodied or *tampan* ticks—prevalent in grassveld. It is possible that hares and other wild animals of the veld are reservoirs of infection, and it is known that cattle are susceptible to the disease although they do not die from it. The prevalence is greatest in the summer months, but in the low-veld cases

may occur at any time of the year. Several cases have been reported from the Witwatersrand in which the infection was acquired during the process of deticking dogs.

The disease is rarely if ever fatal, at any rate among people under 45, and probably a great many cases occur undiagnosed among Natives and among European children on farms. The illness can be very severe in adults, and completely incapacitating. Parties picnicking, shooting, and camping are liable to acquire the infection. Recently the disease has occurred among troops bivouacking in tick-infested country. When larger-scale camps are established, preventive measures can be taken by burning off the grass or otherwise clearing camp sites. Personal prophylaxis consists in wearing "slacks" of stout material with short puttees to prevent ingress of ticks at the ankle, and after the march or walk is over spraying from the knee downwards with Hysec or some other insecticide. Barelegged child members of picnic parties are obvious candidates for tickbite fever. It is worth remembering that ticks are more numerous under trees than in the open, owing to the frequency with which veld animals both great and small rest and take shelter there.

From the diagnostic viewpoint it is important to remember tick typhus, in which there is usually intense headache, as an alternative to malaria and to relapsing fever. Neosalvarsan, which acts as a specific in the treatment of relapsing fever, is harmful in cases of tick typhus.

22.—VENEREAL DISEASES.

The direct measures to deal with these diseases initiated or extended by this Department during recent years have been the following:—

1. Extending medical and nursing services in rural and Native Territories. Such foundation services are essential to bring venereal disease treatment within the reach of all.
2. Assisting institutions such as general and mission hospitals by the provision of drugs and payments for maintenance of patients.
3. Establishing rural clinics and venereal disease tours in as many districts as possible.
4. Improving district surgeoncy services, in many cases by converting part-time appointments into whole-time posts.
5. Stimulating local authorities to provide local services especially in the form of location health services.
6. Stimulating local authorities to appoint full-time medical officers of health as an essential basis for a complete local health service.
7. Instituting a national health campaign.
8. Training district surgeons in modern methods of treatment.

The great needs of the country have been firstly a medical and health organisation reaching all sections of the community, and secondly a campaign of health education. Much has been achieved in the last few years. All the larger local authorities now have full-time medical officers of health, who have *inter alia* established comprehensive schemes for dealing with venereal diseases. In the country districts venereal disease tours and clinics have been rapidly multiplied, but the Native Territories have still to receive adequate attention. Here, as in other areas, the primary need is for a basic health and medical service. Such a service will mean the treatment not only of venereal disease but of numerous other destructive and debilitating conditions which are sapping the vitality of the Native populations. Yet the mere establishment of medical services in the Native Territories is in itself insufficient. The Native has to be prepared for the acceptance of European health and medical ideas. The provision of facilities for treatment without the parallel health education of the Native peoples will not achieve much.

Consequently the Department, through the co-operation of the South African Red Cross Society, has commenced a national health education campaign. A National Health Education Committee has been established which by its inclusion of all the leading health, social, educational and Native Welfare workers of the Union is extremely well equipped for undertaking this work.

Parliament during its last session showed much interest in the subject of venereal diseases. A valuable debate took place which led to the adoption by the Government of two proposals. Firstly that there should be appointed to the staff of this Department a medical officer to co-ordinate the various activities in connection with venereal diseases and secondly, that there should be created a committee to advise the Department on problems connected with these diseases. An equally important legislative outcome of the recent session was the acceptance by Parliament of the need for a Native health and medical service. A small beginning with three units was authorised. The gradual extension of this service will create an organisation of fundamental importance in combating and preventing venereal disease in the Native Territories.

As in previous years Table 41 is given to indicate the work undertaken by hospitals, clinics, and district surgeons during the year.

23.—OTHER INFECTIOUS DISEASES.

The first two columns of Table 42 give the incidence of the notifiable diseases for the year under review in this report and the previous year.

The most important increases in infection are those of diphtheria, puerperal fever, scarlet fever, tuberculosis and typhus. A gratifying decrease is that of enteric fever, which fell from 4,103 cases for the year ending 30th June, 1938, to 3,558 for the year ending 30th June, 1939.

The table deserves study. It demonstrates clearly in so far as infectious diseases are notifiable how much preventable disease is occurring. Though tuberculosis is a disease of complex origins and causes and hence requires comprehensive measures to control, enteric, diphtheria and typhus on the other hand are diseases which simplicity of prevention should see abolished. Yet they figure at the top of the list numerically considered and are therefore regrettable evidence of the immaturity and incompleteness of the social health and medical services of the country.

IV.—OTHER DISEASES AND CONDITIONS.

24.—CANCER.

It should not be necessary to draw attention to the seriousness in South Africa of the problem of cancer. Yet it is often not realised that the importance of cancer as an agent of death is steadily increasing. One of the factors responsible for this, paradoxical though it may seem, is the success of public health measures in general with the resulting increase in the average age of the population and the consequent additional importance of the diseases of later life. Improved methods for the control of infectious diseases by bacteriological and administrative means were made possible by the great increase in scientific knowledge initiated by the work of Louis Pasteur, Robert Koch and others towards the close of the last century. The control by bacteriological and other scientific methods of most of the commoner infectious diseases is now largely a matter of the application of well established knowledge. Whether or not it is possible to control an infectious disease in any particular region depends very largely upon whether the appropriate measures are practicable at a reasonable cost and whether the necessary funds are made available. The fact that the control of infection has reached so advanced a stage tends to throw more and more emphasis on the factors of degeneration and on the diseases of late middle life and old age; for this reason the subject of cancer is becoming progressively more important as a public health problem.

The question has arisen, and with the passage of time it becomes more insistent, as to whether or not we are able to influence in any way the problem of the increasing incidence of cancer. A generation ago this question was not even considered as falling within the scope of the public health official whose functions were conceived as being the control of infectious diseases. More and more importance is, however, being attached to the investigation of the causes of diseases which are not of an infectious nature in the usual sense of the phrase, and it is interesting to speculate to what extent these are likely to come under the control of the public health administrator. Our knowledge in regard to many of these conditions is very incomplete. As it is an accepted principle that sound preventive work must have its foundation in scientific knowledge regarding the cause of disease, we are not yet in a position to exercise effective control measures in regard to these diseases. This is particularly true of cancer where we are as yet merely dealing with the appalling results as they arise without being able to prevent them, except in certain comparatively rare and limited instances, such as in some industrial conditions. Although a tremendous amount of scientific research work has been undertaken and although a large number of interesting facts have come to light, we are still unfortunately groping in the dark in regard to the origin of this condition. Certain facts are known, such as that long continued irritation of a part seems liable to be associated with a condition of uncontrolled proliferation of the tissue cells. When this group of cells invades and destroys other tissues and gives rise to secondary growths in other parts of the body, it is said to show the characters of "malignancy" or to be a "malignant growth"—in common parlance, "cancer". Apart from this question of irritation, which is well recognised in regard to certain types of industrial cancer, such as Mule Spinners Disease and Chimney Sweeps Cancer, our knowledge of the cause is still very scanty. Various hypotheses have been advanced at different times and it is possible that one or more of these may ultimately be shown to be along the right lines. If this proves to be the case as our knowledge of the cause increases, a wide vista of preventive medicine will open up. At the present time, however, our knowledge is not such as makes it possible to take any adequate preventive measures except in regard to the few conditions to which reference has been made.

Although true prevention is as yet not attainable in most cases it must be emphasised that much can be done by early treatment. The importance of obtaining an early diagnosis and skilled medical or surgical attention immediately there is any suspicion of a cancerous growth cannot be too greatly stressed. By surgical intervention it is possible in the great majority of cases to eradicate the condition completely, provided medical assistance is sought at a sufficiently early stage. Delay on the other hand is fatal as this gives the cancerous cells an opportunity of spreading to other parts of the body, when cure becomes impossible.

The community as a whole is becoming alive to the necessity for tackling this question in a whole-hearted fashion. The National Cancer Association of South Africa, which was established with a view to promoting this object, has received a considerable measure of public support. The circumstances relating to the development of this body were discussed in the last annual report of this Department and need not be recapitulated here. The Association has done a great deal of valuable propaganda work and has interested large numbers of people in the problem. One of the chief aims,

however, of this Association is the establishment of a cancer institute and its work in interesting public opinion in this matter is of the greatest importance. Such an institution is necessary if we in South Africa are to contribute towards the store of knowledge which is being built up all over the world in regard to this scourge. It is sometimes thought that the cost of cancer research which has been and is being done in other countries is disproportionately great in view of the slow progress that is being made. In regard to this aspect it must be emphasised that what is most necessary in South Africa is clinical research and that this is considerably less costly than laboratory work. The developments in regard to the proposal to establish a cancer institute were described in considerable detail last year; it is only necessary to add that unfortunately the position remains unaltered. The government has not as yet been able to make the financial contribution which it was hoped might be provided for this purpose.

We have a large store of clinical material available in this country, more particularly in Johannesburg, and this material is at present very largely wasted from the point of view of furthering our knowledge of the subject. It must be realised that there is a very valuable source of clinical material in our Native population. It is well-known that Natives are less susceptible than Europeans to most kinds of cancer; but it is also known that there is one form of cancer, primary carcinoma of the liver, which appears to be relatively frequent among Natives and which is very infrequent among Europeans. We are not in a position as yet even to make any suggestions as to why there should be these great differences of susceptibility between Europeans and Natives. We are entirely ignorant as to whether the peculiarities of the Native in regard to cancer are due to inherent racial qualities or whether they are in some way associated with his environment. Nor do we know whether the changing environment of the Native, the vast changes which a large proportion of the Natives are undergoing from tribal to urban conditions of life, are in any way influencing their susceptibility to the various kinds of cancer. There is another factor in which we in South Africa are vitally interested and that is the suggestion that there is some connection between excessive ultra violet radiation and cancer. The view has been expressed that it is possible that the great amount of ultra violet radiation to which we in this country are subjected may possibly be a contributing factor towards the formation of cancerous growths. This, however, is a matter about which we know very little and which awaits further investigation.

It is possible that research along clinical and possibly other lines might throw light on some of these problems which are to a great extent peculiar to South Africa. It is further possible that the knowledge so gained would have far-reaching results in helping to elucidate the problem as a whole. It is conceivable therefore that we in South Africa have unique opportunities for adding to the store of knowledge on this subject; such potential opportunities should no longer be allowed to go to waste.

It is greatly to be regretted that the Government has not been able to provide the desired funds for assisting in the establishment of a cancer institute. It is earnestly hoped that the question will again receive consideration.

25.—MALNUTRITION.

The nutrition survey has been very usefully extended and continued. It now consists of the following sections:—

1. A preliminary general survey of European school children. This survey was conducted on behalf of the Department by the school medical inspectorates of each province. Simple physical and clinical examinations and simple records of dietetic habits were made. The records of 140,928 children throughout the Union were collected. These records are now being analysed by the Office of Census and Statistics. In April last the Department issued an interim report on the results of the examination of the returns for European boys. The main findings of this report are given in the following table. Groups 3 and 4 indicate the percentages of boys with slight and marked malnutrition respectively:—

TABLE 43.—PERCENTAGE OF CHILDREN IN EACH NUTRITIONAL CLASS BY PROVINCES.

Province.	Percentage of Children in each nutritional class.					Total Children.
	1	2	3	4		
Cape.....	9.6	58.8	27.3	4.2	100	19,914
Natal.....	22.5	61.0	13.3	3.1	100	2,747
O.F.S.....	15.3	41.1	35.7	7.9	100	4,546
Transvaal.....	5.3	47.1	39.6	8.0	100	30,958
UNION.....	8.4	51.3	33.8	6.5	100	58,165

The analysis of the dietetic data is subject to many fallacies, but even allowing for this, the survey returns have been significant. They demonstrate a deficiency of protective foodstuffs, especially of milk, in each province. The entire absence of milk from the diet of large proportions of the survey children is shown in the following percentages of children not receiving this article:—

Cape	28	per cent.
Natal	20	per cent.
Orange Free State	16·5	per cent.
Transvaal	27·7	per cent.

The lack of vegetables and fruit was especially obvious in the diets of children of the Transvaal and Free State.

Further reports on the material collected by this survey are to be issued shortly.

2. The preliminary general survey described above did not include the Native population. It being general knowledge that manifestations of malnutrition, even to a marked degree, were not uncommon in this section it was decided to use the available funds to secure an assessment of the incidence of the conditions in sample communities. A team has now practically completed the examination of seven hundred Native school children in each of the urban locations of Pretoria, Bloemfontein and Maritzburg, and the rural areas of Tzaneen, Bochem, Witzieshoek, Kentani, Qumbu and Nqutu. Simple clinical and anthropometrical data have been collected, which will provide the first comparative health study made of Bantu communities of different types. Reports are to be issued in the near future and it is anticipated that these will be valuable to health authorities from many other aspects than that of malnutrition alone.

3. The Indian community is being studied in Durban. Special attention is being given in this investigation to the diet, and to the incidence of tuberculosis, a disease peculiarly influenced by the factor of malnutrition.

4. The more detailed dietary, clinical, sociological and economical factors of malnutrition are being investigated on behalf of the Department by several teams of workers. On the Witwatersrand Professor Gray and Miss Malherbe of the Witwatersrand University are conducting a detailed study of sociological factors in the causation of malnutrition in various European groups. A team of workers under Professor Brock of the University of Capetown, including Professor Batson and Drs. Latsky, van der Walt and Baumann are determining clinical and sociological factors affecting the nutrition of both European and Coloured groups in the Cape. Dr. F. W. Fox, through the good offices of the Director of the South African Institute for Medical Research, is shortly to undertake an analysis of agricultural, social and dietetic influences in the same problem as it appears in European rural communities in different regions of the Union. A further fortunate co-operation has been arranged, by permission of Professor John Orr of the Witwatersrand Technical College, with Dr. E. Jokl. Dr. Jokl is correlating functional performance with the state of nutrition of different racial and social classes. Finally in connection with this research programme the Department is using its Dental Health Officer to investigate dental caries, and its dietitians to report on the diets of such classes as indigents, inmates of reformatories, hospital patients and school hostel groups.

With the limited funds at its disposal the Department has not been able to pursue nutritional research into such important fields as the chemical constitution of South African foods or to organise field experiments using supplementary items such as dried milks, salts and vitamins. Mass methods of supplying known general deficiencies such as the vitamins in the diets of most Native groups should be tried, and if the opportunity and the funds present themselves will certainly be used.

Though the detailed conclusions of the various surveys are not available, the general impressions already gained by all observers leave no doubt that both gross undernourishment and malnutrition exist in many communities, but especially in the Native populations. The Union is faced with a serious problem. It is a problem increasing in gravity, and demanding comprehensive continued investigation and bold measures for solution.

26.—POOR RELIEF.

Nominally poor relief still falls, under the South Africa Act, 1909, as supplemented by the Financial Relations Act of 1913, to be administered by the four Provincial Administrations. Poor relief in this sense includes the subsidisation of charitable associations and the provision of free medical services.

A notable development since Union has been, however, the increasing participation in the field of poor relief by the Central Government. Through blind and old age pensions, aged and invalid settlements, grants-in-aid for

the maintenance of children, and invalidity grants, the money being distributed by the central administration, now exceeds many times that paid out in poor relief by the provincial authorities.

That the control of the measures for relieving poverty had been recognised as inadequate led to the appointment of the Inter-departmental Committee on Poor Relief and Charitable Institutions. Its report appeared in 1937 and should be consulted for full information on the extent of government activity in this field.

In the present report, it is desired to define more clearly the relationship of poverty to the health of the community. Such definition is needed if the evolution of public health and social welfare in this country is to be simplified and accelerated. Throughout public health history it has been recognised that poverty and disease are causally related. It was the discovery of the correlation of poverty with preventable disease which indeed led to the establishment of the first public health service in England last century. This correlation has since become axiomatic, so that to-day social and economic betterment are fundamental features of most public health programmes. Nevertheless administrative separation has seriously hampered the comprehensive study of these two fields of poverty and disease. Though numerous writers in England revealed the benefit that would accrue in the saving of poor rates if disease were prevented in poor communities, it was not until 1929 that the "Poor Law" was broken up. It was the passing into law of the Local Government Act of 1929 which brought poverty and disease control under the same administrative authorities both locally and centrally. This remarkable abolition of age-old systems opened the way to the comprehensive and rational planning of community life which has since occurred in England. Poverty as a cause of disease and disease as a cause of poverty are now being tackled not haphazardly, not piece-meal, not disjointedly, but systematically and comprehensively.

It is regrettable that South Africa has so frequently been unwilling to learn from the errors of the older countries. Probably no sphere of activity has suffered more from this lack than public health. In South Africa the State public health organisation is seriously defective as it does not control hospitals, local government school medical services, mental hospitals and poor relief. Two years ago a progressive step was taken in marshalling the majority of a heterogeneous group of social activities under the control of a new Government Department in the Department of Social Welfare. The co-ordination thus achieved is most satisfactory, but many incongruities and inefficiencies still exist. These may be accentuated if the subject of poor relief now being examined in the light of the findings of the Inter-departmental Committee on Poor Relief and Charitable Institutions is not linked up directly with the health organisation. A State solution of poverty must admittedly seek remedies in many fields. However, the known causative and correlative relationship with slum conditions, malnutrition, infectious and preventable disease, mental defects, insanitation and environmental handicaps, necessitates the direct participation of the health administration in securing permanent rehabilitation of the pauper classes.

27.—"MEASLES" IN SOUTH AFRICAN STOCK.

The effective control of tapeworm infestation of man is primarily a problem of successful prophylaxis. While medicinal treatment eliminates the parasites readily in most cases, it is quite impossible to get rid of them in many others. The elaborate measures which are necessary in every case, moreover, renders mass therapeutics an impractical approach. This becomes increasingly evident as information accumulates regarding the widespread infestation by this parasite, particularly among the non-European races of South Africa.

For prophylaxis two procedures may be adopted, viz.—

- (a) the prevention of infection of man himself by the destruction or sterilising treatment of measly meat;
- (b) the prevention of infection of cattle and pigs from human excrement, through adequate sanitary precautions.

Infected animals cannot be recognised until slaughtered. Moreover, *pre-mortem* diagnosis is of no direct value, as no remedy is known which can kill the cysticerci in the live animal. The animals remain apparently healthy and can safely be used for breeding purposes, though not for human consumption.

If the eggs of *Taenia Solium* are swallowed by man, human cysticercosis occurs. Though a rare condition, its effects are serious. The bladder-worms may reach and develop in the brain, the eye, the liver, the lungs, the heart and the muscles, leading to correspondingly severe disability.

According to the Regulations regarding Slaughtering and Meat Inspection the procedure at meat inspections is that, if the meat inspector, in the course of his routine inspection, finds a cysticercus or two, he must

make certain additional detailed examinations of the head, tongue and jaw muscles, the pluck, the outer surfaces of the alimentary tract and make incisions into the shoulder, chuck, brisket, diaphragm, fillet and the large muscular surface exposed on splitting the carcass.

If ten or more cysts are discovered the whole carcass must be condemned. If there are less than ten and these are not widely distributed, the obviously diseased portions may be removed and the carcass, if the owner so desires, kept in cold storage at temperatures of minus 10° C. or less for at least fourteen days. If thus exposed the larval worm dies.

Unless these precautions are taken man may be infected from measly beef and pork. The widespread distribution and high incidence of the condition of measles, and the low stage of development of the greater part of the non-European population of South Africa are factors which render the risk of continued dissemination of the tapeworm infestation extremely great.

The main reservoirs of infection in the Union are the Native Territories. Native customs and habits in such areas are a serious factor in propagating the disease. Within the Union the average incidence of measly cattle and swine is about 5 per cent. The Highveld is relatively free from infection except in the immediate vicinity of Rustenburg and Pietersburg. The incidence in the Free State is very low. Ninety per cent. of pigs in the Transkei is said to be infected. In the Eastern Province and Natal, European and Native cattle are heavily involved.

This universality of measles infection has increasingly perturbed the farming community, local authorities and the Central Government. A conference following representations made by the Agricultural Unions was therefore called in Pretoria in June, 1939. It was attended by members of each Agricultural Union, the United Municipal Association, and the Union Departments of Agriculture, Native Affairs and Public Health. After a frank exchange of information and discussion of the inherent difficulties certain broad decisions were made. In view of the menace the foci in the Native Territories constituted to the whole population, it was agreed that strong and comprehensive action in these areas was required. Such action necessitated an intensive health educational campaign, the establishment of an adequate Native medical and health service, and the investigation of the newer drugs in an endeavour to obtain remedies suitable for mass treatment.

The fact that under present conditions the Native Territories are almost entirely lacking in health and medical facilities was considered deplorable. Until a Native medical and health service is operating, there is no prospect of sanitary control being secured in the Territories or the inhabitants being freed from "measles" infection. Such a service is to be viewed as an essential in the campaign against measles-infested stock. The conference accordingly recommended that this definite requirement be brought to the notice of the Government.

The conference also revealed the fundamental importance of a national health education campaign for all sections involved in the "measles" problem. The Native communities require to be informed of the need for better sanitary customs and methods, and of the importance of being treated for tapeworm. The urban local authorities, especially the smaller areas, require to be enlightened on the benefits conferred on the community as a whole which follow the provision of location sanitary and health services. Amongst many farming communities there is still existing a lax attitude towards the necessity of hygienic standards in the disposal of human excrement. Scrupulous care in the provision of latrines and their use is essential for all sections of the farming community, for the employee as well as for the employer. It is unfortunately true that on the majority of farms latrines for employees are conspicuous by their absence. The argument that it is useless to provide such conveniences for primitive peoples as they will not be used is fallacious to a considerable extent, and wholly defeatist. Much education is therefore called for in this field. The conference also strongly recommended that all large authorities employing mobile labour gangs should be urged to make adequate latrine arrangements. In many respects these mobile gangs are considered especially harmful in distributing infection.

A continuation committee is to be established to maintain interest in this important national problem.

The Department also undertook a further meat investigation. Dissatisfaction as to certain conditions in the use of abattoirs, and in the interpretation of certain sections of the meat and slaughter regulations, led to an officer of the Department of Agriculture and an officer of this Department combining to study the problem of the Reef abattoirs, and the problem of meat incisions required in the above regulations. The investigation is not yet complete.

PART II.

HEALTH ADMINISTRATION.

V.—HEALTH STAFFS.

28.—STAFF OF THE UNION DEPARTMENT OF PUBLIC HEALTH.

Though the staff chart included in this section is somewhat cumbersome it has been retained as being a useful summary presentation of departmental organisation. As this organisation was discussed in some detail in the report of last year, it is not proposed again to review the whole system.

The Department has during the past two years suffered heavy losses by the retirement on superannuation of several senior officials. Dr. G. Park Ross, Deputy Chief Health Officer at Durban, retired in January of this year after many years of distinguished service, more especially in Natal. Dr. Park Ross had secured major improvements in Natal sanitary and health conditions, and had been intimately concerned in the evolution of the Natal malaria organisation which has so successfully combated that disease. A senior administrative officer, Mr. L. J. Hatch, retired in June. As Accountant and in his capacity as Secretary to the recent Committee of Inquiry into National Health Insurance, Mr. Hatch had developed an intimate knowledge of the financial and administrative problems of health and medical services of the Union.

Dr. Louis Fourie retired from the post of Senior Assistant Health Officer, Johannesburg, in December, 1938. The particular contributions made by Dr. Fourie to South African public health were his studies on the natural history and field conditions of plague, typhus and malaria. As the outstanding South African authority on plague field conditions the Department has been fortunate to retain his services by the appointment of Dr. Fourie as Plague Consultant.

These retirements have resulted in many changes in the senior professional appointments. Dr. A. J. van der Spuy has been transferred on promotion to the Department of Defence as Director of Medical Services. Dr. F. W. P. Cluver succeeded Dr. G. Park Ross as Deputy Chief Health Officer at Durban and Dr. H. S. Gear succeeded Dr. E. H. Cluver as Deputy Chief Health Officer at Pretoria. Dr. B. M. Clark succeeded Dr. L. Fourie as Senior Assistant Health Officer, Johannesburg, while Dr. J. H. Loots succeeded Dr. A. J. van der Spuy as Assistant Health Officer, Pretoria, and Drs. J. J. du Pré le Roux and A. L. Ferguson were appointed Assistant Health Officers at Capetown and Durban respectively.

The post of Senior Assistant Health Officer (Railways), occupied by Dr. C. G. Booker, has been redesignated Deputy Chief Health Officer (Railways).

Dr. D. H. S. Annecke has had his post regraded to that of Senior Malaria Officer. Dr. R. J. Smit succeeded to the vacancy of Medical Inspector at Umtata, while Dr. G. W. Gale was appointed to the new post of Medical Inspector at Pretoria.

Dr. A. R. Davison succeeded Dr. J. H. Loots as Medical Superintendent to the Pretoria Leper Institution.

New activities of the Department in the important fields of dental health and dietetics are being developed following the new appointments of Dr. T. Ockerse as Dental Health Officer and Miss G. M. Sedgwick as Senior Dietitian.

A combination of circumstances has made the last year particularly arduous for the whole staff, and more especially that of the head office. A succession of staff changes due to superannuation, sick leave; the malaria epidemic; the growth of district surgeoncies and local authority health departments; the call for new departmental activities such as nutritional investigations, solar radiation survey, plague and dental research, health education and dietetics have all been factors causing an unusual strain on the Department during the year.

Colonel P. G. Stock, C.B., C.B.E., of the Staff of the Ministry of Health, London, has continued to represent the Union Government on the International Health Office and as the unofficial liaison officer of the Department with the Minister of Health, London.

The Department has continued to receive much assistance from the South African Medical Association, the various municipal health staffs, the Director and staff of the South African Institute for Medical Research, and the Chief Medical Officer of the Rand Mines, Dr. A. J. Orenstein, C.M.G.

Minister of Public Health (Hon. R. R. STUTTAFORD).

Minister (Chairman).
Secretary and Chief Health Officer (Deputy Chairman).
Director of Veterinary Services.
Mrs. S. B. Broers.
Messrs. W. J. O'Brien, M.P., and L. C. Serrurier.
Drs. K. Bremer, M.P., A. J. Orenstein, C. P. Theron, and
Sir Spencer Lister.

Council of Public Health

Secretary and Chief Health Officer (Dr. E. H. Cluver).†

Deputy Chief Health Officer
(Dr. H. S. Gear).

Under Secretary (A. DE V. BRUNT).

Departmental Chief Clerk (A. Stuart).

1 Accountant (L. J. Hatch).

1 Chief Clerk Gr. II.
(R. S. Gordon).

3 Principal Clerks
(P. I. Phelan, N. A. G. Reeler and
J. Sanders).

4 Senior Clerks.
60 Clerks, Typists, etc.

Sections.

Detached Officers.	Inspection and Special Staff.	Maternity and Child Welfare.	Pathological and Biological Control Laboratories.	Port Health Officers.	District Surgeons.	Leprosy.	Veneral Diseases Hospitals.	Malaria.	Tuberculosis.	Epidemic and Infectious Diseases (Plague, Typhus, Smallpox, etc.), and Vaccination.	Food and Drugs Adulteration; Habit-forming Drugs.	Local Authorities.	Other Bodies.
Capetown: Chief Health Officer: Dr. P. Allan. Assistant Health Officer: Dr. J. J. du Pré le Roux. Durban: Chief Health Officer: Dr. F. W. P. Cluver. Assistant Health Officer: Dr. A. L. Ferguson. Port Elizabeth: Chief Health Officer: Dr. B. M. Malherbe. One Ecologist on contract (Mr. D. H. S. Davis). Five Inspectors (4 plague and 1 typhus). Johannesburg: Senior Assistant Health Officer: Dr. B. M. Clark. A. Railways and Harbours: Deputy Chief Health Officer: Dr. C. G. Booker.	One Medical Inspector Native Territories (Dr. R. J. Smit). One Dental Health Officer on contract (Dr. T. Ockerse). One Senior Dietitian (Miss G. M. Sedgwick). One Dietitian (Miss M. R. Malherbe). One Ecologist on contract (Mr. D. H. S. Davis). Five Inspectors (4 plague and 1 typhus).	Medical Inspector (Dr. E. Drennan). 3 Nurse Lecturers.	Capetown, and Vaccine Institute, Rosebank: (Drs. W. F. Rhodes, R. Turner and I. Gordon). Capetown Biological Control Laboratory: (Drs. M. H. Finlayson and H. A. Shapiro). Durban: (Dr. B. Sampson). *South African Institute for Medical Research, Johannesburg. (Dr. G. H. Melring).	Capetown: (Dr. J. M. Bosman). Durban: (Dr. G. A. Batchelor). Port Elizabeth: (Dr. H. W. A. Kay). East London: (Dr. E. V. S. Stevenson). Simonstown: (Dr. A. B. Bull). Knysna: (Dr. C. F. M. Marnewecke). Mossel Bay: (Dr. J. J. v. Reenen). Port St. Johns: (Dr. G. H. Melring).	27 Whole-time. 7 Part-time. 342 Total. 376 Total.	Leprosy Advisory Committee: Secretary and Chief Health Officer (Chairman): Sir Spencer Lister. Professor W. H. Craib and Dr. W. F. Rhodes. Drs. A. Pypert, A. J. Orenstein, K. Bremer, M. P., G. W. Robertson, F. C. Willmot, G. A. Park Ross.	Veneral Diseases Advisory Committee: Chairman: Chief Health Officer; Dr. H. Gluckman and departmental medical officers. Rietfontein, Johannesburg: (Drs. J. Daneel and J. Meyer). King Williamstown: *Bochem. *Ellm. *Jane Furse Memorial. Several smaller hospitals.	Transvaal: Senior Officer: (Dr. D. H. S. Annecke). Inspectors and Assistants. Natal: Medical Inspector: Dr. C. A. M. Murray. Inspectors.	Tuberculosis Advisory Committee, Chairman, Dr. P. Allan. Nelspoort Sanatorium: (Drs. H. Ackermann and P. Scher). Rietfontein Hospital. King George V Hospital: (Dr. B. A. Dormer). In addition to these Institutions under the direct control of the Department there is a number of other hospitals where accommodation is available.	Field Staff. District Surgeons. Local Authorities. Magistrates, etc.	Inspectors, Customs, Police, etc. Chemical work done in chemical laboratories of Department of Agriculture at Capetown & Johannesburg. Pharmacist.	241 Municipalities. 97 Village Management Boards. 39 Local Boards. 31 Village Councils. 58 Health Committees. 9 Local Administration and Health Boards. 95 Divisional Councils. 1 Health Board. 162 Magistrates. 5 Mining Commissioners. 738 Total.	Central Housing Board, Chairman, Sir E. N. Thornton. Members: Messrs. R. S. Gordon, F. L. Jameson, J. Lockwood Hall, G. A. Savidge, E. Williamson, (Assessor Member). (Sec. J. Sanders, Secretary). South African Medical Council South African Pharmacy Board. Rand Water Board.

29.—LOCAL AUTHORITIES AND THEIR HEALTH STAFFS.

There has been an increase from 737 to 738 in the number of constituted local authorities in the Union. The detailed classification of these bodies is given in Table 44.

TABLE 44.—LOCAL AUTHORITIES UNDER THE PUBLIC HEALTH ACT (1919)
AS AT 30TH JUNE, 1939.

Province.	Municipalities.	Village Management Boards.	Local Boards.	Village Councils.	Health Committees.	Local Administration and Health Boards.	Magistrates.	Divisional Councils.	Board of Health.	Mining Commissioners.	Total.
Cape.....	134	93	23	—	—	—	30	95	1	1	377
Natal.....	11	—	16	—	21	9	45	—	—	—	102
Transvaal.....	32	—	—	31	37	—	48	—	—	3	154
Orange Free State	64	4	—	—	—	—	39	—	—	1	109
UNION.....	241	97	39	31	58	9	162	95	1	5	738

Wherever the circumstances justify such appointments the Department urges local authorities to employ medical officers of health, health inspectors and health visitors in a whole-time capacity. The value of such whole-time officers is beyond question. This is indicated by the assistance given by the Department in terms of the Public Health Act to local authorities appointing such officials.

Whole-time medical officers of health are employed by 15 municipalities, namely, Benoni, Bloemfontein, Boksburg, Capetown, Durban, East London, Germiston, Johannesburg, Krugersdorp, Pietermaritzburg, Port Elizabeth, Pretoria, Roodepoort-Maraaisburg, Springs and Vereeniging. The Divisional Council of the Cape also employs a whole-time medical officer of health. A special arrangement at Kimberley has resulted in the establishment of two combined posts of medical officer of health and district surgeon to the Municipality and Board of Health. At Grahamstown, Kingwilliamstown, Queenstown and Cradock there are whole-time officers who carry out the combined duties of district surgeon and medical officer of health to the Municipal and Divisional Councils. At Brakpan a combined post of municipal medical officer of health and district surgeon exists.

These officers and many part-time medical officers of health have continued to co-operate actively with the Department in the promotion of public health with the result that the standard of living and health conditions in local communities is steadily rising.

The major developments have been largely on the Reef. The medical officers of health recently appointed to the smaller municipalities have transformed conditions in these areas in the last two years. The rise in the level of hygiene, cleanliness and comfort, the decrease in the incidence of such preventable diseases as typhoid and infantile diarrhoea, and the increase in security against health hazards, are direct advantages secured by the new health departments. The active interest of all the Reef municipalities, Durban, East London, Port Elizabeth, Capetown, Bloemfontein and Kimberley and the smaller health departments, in slum clearance, rehousing, clinic services and location health conditions, has been a valuable influence in health movements during the last year.

So direct and wide are the benefits conferred on local communities by full-time officials—medical officer of health or health inspector—that the Department is eager to see their number increased. It has often given consideration to securing more numerous appointments of this nature by a system of combining several local authorities incapable individually of meeting the necessary expenditure. Where circumstances warrant such arrangements they will be actively encouraged.

30.—THE DISTRICT SURGEONCY SYSTEM.

District surgeons have been concerned in State medicine from the earliest days of European occupation of South Africa. The Government, when it first assumed responsibilities for preventing the entrance into and control of infectious disease within the Union, discharged this function through district surgeons. Such public health duties were additional to the medico-legal work undertaken by these officers. The system has expanded with the settlement of the country and at Union was continued on a national basis. The elaboration of the Government health organisation has placed an increasing number of duties on district surgeons and parallel with the growth of means for the prevention of disease their work has

become more comprehensive. To-day a district surgeon is not considered adequately to have fulfilled his functions if he has merely treated patients sent to him and obeyed instructions to report on police cases. He is expected to take an active interest in the health of his district. He has to carry out vaccination tours, report on insanitary conditions in the area, and, when called upon, act as medical officer of health to any local authorities in his district not possessing such an officer.

It is in respect of venereal diseases that the district surgeon especially has come, in recent years, to play an important public health role. Outside the areas of local authorities, who conduct their own clinics, the district surgery system is the means whereby the Department is providing venereal disease treatment and control throughout the country. This implies that no district, however remote, is without facilities for treatment. In pursuance of a more active venereal disease policy in recent years the Department has elaborated the services in an increasing number of areas by establishing clinics which the district surgeon regularly visits. Successful clinic schemes are now being conducted in the Pietersburg, Blaauwberg, Pretoria, Rustenburg, Ermelo, and Middelburg districts in the Transvaal and in various districts in Natal and the Cape. It has been found that for this purpose full-time officers are especially useful. This has been one of the more cogent reasons for the policy now being followed by the Department of converting part-time into full-time posts.

The Department is also looking to its district surgeons to strengthen local health organisation in another manner, by using them as medical officers of health. Many a local authority, eager to improve its health and sanitary conditions, is hampered by the lack of technical assistance. The appointment of a full-time medical officer being too costly in the smaller areas, the Department has assisted in many instances by securing a full-time combined post of medical officer of health and district surgeon. Such officers being freed from the trammels of private practice are enabled to prosecute vigorously a programme of local health improvements. Such combined posts exist in six areas, namely, Brakpan, Grahamstown, Queenstown, Kimberley, Kingwilliamstown and Cradock.

As in the vast majority of areas the district surgeon is the departmental technical representative, the Department has undertaken various measures to keep such officers technically proficient. Every year courses, undertaken alternately by the Universities of the Witwatersrand and Capetown, provide instruction in recent advances in all spheres of district surgery work. Bulletins and pamphlets are also issued by the Department to keep its district officers fully informed on health matters. Consideration is being given to the possibility of utilising the district surgery service more vigorously as a health educational channel. The National Health Education Committee, established by the Department as a result of negotiations with the South African Red Cross Society, is providing much valuable propaganda material which the Department hopes will shortly be available for district surgeons.

Table 45 differs from that of last year in the increase of whole-time officers. Twenty-seven full-time district surgeons are now employed by the Department as against seventeen last year.

TABLE 45.—DISTRICT SURGEONCIES AND ADDITIONAL DISTRICT SURGEONCIES AS AT 30TH JUNE, 1939.

Province.	Whole-time.	Whole-time, but jointly with local authority or public body.	Part-time.			Total.
			On inclusive annual salary.		On annual salary with certain supplementary fees and allowances.	
			District Surgeons.	Additional District Surgeons.		
Cape.....	6	6	—	30	133	175
Natal.....	3	—	—	2	43	48
Transvaal.....	16	1	1	22	50	90
Orange Free State..	2	—	—	15	46	63
UNION.....	27	7	1	69	272	376

The twenty-seven whole-time posts are those at Capetown (2); Durban (3); East London; Port Elizabeth; Pretoria (4), (one at Bronkhorstspuit); Johannesburg (4); Pietersburg (2); Bloemfontein (2); Wynberg; Knysna; Heidelberg (Tvl.) (2), (one at Nigel); Vereeniging; Nylstroom; Rustenburg and De Lagersdrift (district Middelburg, Tvl.).

VI.—HOSPITAL AND NURSING SERVICES.

31.—GENERAL HOSPITALS.

The system of routine inspection on behalf of the Provincial Administration of the State-aided hospitals and kindred institutions in the Cape Province, Orange Free State and the Transvaal was continued during the year. As in previous years, the public hospitals of the Reef and in Pretoria were inspected by the members of Public Hospitals Advisory Council. The hospitals in Natal are State institutions, with the exception of one which is subsidised, and are not inspected by officers of this Department.

Owing to a shortage of staff and the pressure of more urgent work, it has not been possible during the year to inspect as many hospitals as is desirable. It is, however, anticipated that during the coming year this will be possible and that all hospitals will receive at least one routine inspection.

In addition to routine hospital inspection, this Department, in consultation with the Public Works Department, scrutinised and advised the Provincial Administrations on many new hospital projects, including alterations and additions to existing hospitals, and it is clear that hospital activity and expansion is proceeding apace. The increasing use which the Native population is making of hospital services and the consequent increased demand for Native hospital accommodation has been very noticeable.

In the last year or two the Department has noticed an increasing tendency of many local communities to agitate for the establishment of small local hospitals. Such an interest in hospital matters is certainly commendable. But it is not always appreciated that the establishment of new hospitals, especially of the small cottage type, is not a simple matter. It is therefore useful to outline some of the reasons which have influenced this Department in advising Provincial Administrations not to approve of many of the schemes for small country hospitals recently proposed. In the first place hospitals are complicated organisations incorporating a multitude of functions, services and requirements. The buildings are not simple; they are expensive, and have to be supplied with perfect services of light, pure water, cooking, heating, sterilising and sanitation. An adequate and efficient staff means a matron, sisters, staff-nurses, probationers, clerical, technical and labouring assistants. The medical personnel for securing the maximum benefit from the institution for the community has to undertake expert surgical, medical, radiological and laboratory functions. Finally the institution requires a satisfactory environment where insanitary and unhygienic conditions have been completely removed. Bearing in mind these complicated needs it will be appreciated that few communities are in a position to provide them. Unless all these needs are met the institution cannot run at its maximum efficiency, and a relatively enormous outlay and expenditure will not have been justified. Centralisation of hospitals in a country of sparsely distributed population therefore becomes necessary. If more hospital beds are required it is usually more economical and efficient to provide them at an existing large institution than to create several scattered small uneconomical units, difficult to provide with services, facilities and staff. This opinion of the Department is but repeating the findings of the various hospital committees especially those of 1925 and 1927.

It is also opportune to refer to another aspect of the hospital problem in this country. With the unfortunate diversity of control of health functions, it has thus far been impossible to link hospitals adequately with other health services. Hospitals, therefore, do not yet play the complete rôle that could be theirs. One further result of this inco-ordination is that frequently local communities tend to give undue emphasis to the hospital, neglecting equal if not more important needs such as location medical services, and child and maternal welfare. The Transvaal Provincial Administration has recently recognised the need for extending the functions of the hospital by appointing a Committee to investigate the position.

32.—NURSING AND MATERNITY HOMES.

Inspections of nursing and maternity homes have been carried out as far as possible with the staff available. Reference to Table 46 will illustrate the work done in this direction, a total of 168 inspections having been carried out by the Department's officials, and 103 by full-time medical officers of health and their staffs. This makes a total of 271 inspections out of 380 registered homes, leaving 109 unvisited. It is the Department's aim to inspect such institutions at least once a year.

TABLE 46.—NURSING AND MATERNITY HOMES INSPECTED DURING THE YEARS ENDED 30TH JUNE, 1935, 1936, 1937, 1938 AND 1939 RESPECTIVELY.

Place.	INSPECTIONS.									
	By Medical Officer of Local Authority.					By Departmental Medical Officer.				
	1935.	1936.	1937.	1938.	1939.	1935.	1936.	1937.	1938.	1939.
<i>Cape Province.</i>										
Capetown.....	1	4	7	11	27	—	—	—	—	—
East London.....	2	4	4	6	7	3	—	—	—	—
Port Elizabeth.....	1	8	14	5	5	—	—	—	2	—
Elsewhere.....	2	—	3	—	—	49	34	81	35	73
<i>Natal Province.</i>										
Durban.....	19	—	11	18	17	—	—	—	1	—
Pietermaritzburg.....	3	—	3	3	—	—	—	—	—	—
Elsewhere.....	—	—	—	—	—	9	24	2	27	15
<i>Transvaal Province.</i>										
Johannesburg.....	35	2	54	43	36	—	—	2	4	—
Other Rand L.A.'s.....	—	—	—	9	6	—	—	—	4	—
Pretoria.....	11	5	13	7	5	—	—	—	—	—
Elsewhere.....	1	1	5	—	—	32	65	30	54	40
<i>Orange Free State.</i>										
Bloemfontein.....	—	—	—	—	—	—	—	—	5	4
Elsewhere.....	—	—	—	—	—	10	29	8	25	36
UNION.....	75	24	114	102	103	103	152	129	157	168

The figures in Tables 47 and 48, which give the available bed accommodation and resident staff, are necessarily variable, and subject to rapid changes, as smaller homes are constantly closing down or opening up, and staff changes are monthly or even more frequent events.

TABLE 47.—BED ACCOMMODATION AVAILABLE IN NURSING HOMES.

Province.	1937.		1938.		1939.	
	European.	Non-European.	European.	Non-European.	European.	Non-European.
Cape.....	1,179	92	1,427	117	1,230	262
Transvaal.....	1,285	137	1,596	217	1,325	240
Natal.....	563	489	655	711	803	629
O.F.S.....	234	—	284	13	166	18
TOTALS.....	3,261	718	3,962	1,058	3,524	1,149

TABLE 48.—PERSONNEL OF NURSING HOMES.

Province.	European.		Non-European.	
	Qualified.	Unqualified.	Qualified.	Unqualified.
Cape.....	371	199	8	40
Transvaal.....	368	185	4	27
Natal.....	188	186	7	108
O.F.S.....	48	11	—	—
TOTALS.....	975	581	19	175

It was discovered during the course of visits of inspection to many smaller urban areas that a great deal of illegal admission of patients to unregistered premises still continued. In many cases this is due to ignorance of the law, but in others it is carried on in spite of repeated warnings from the Department, and in defiance thereof. It is to be regretted that in some instances this irregularity is openly encouraged by local medical men, and without their support the Department finds it difficult to bring about any improvements.

In far too many instances trained nurses or midwives, who have registered a nursing home, have been forced to abandon the attempt, because they cannot compete with a home registered by an untrained woman. The difference in fees is small, but public opinion is often on the side of the "gamp".

In the Transvaal the payment by the Provincial Administration of 10s. per diem to a subsidised district nurse who admits pauper cases to her registered nursing home has resulted in the admission to suitable surroundings of a great many women who would otherwise have been confined in most unfavourable circumstances. Admission is only sanctioned on a magistrate's order, and only where no alternative hospital accommodation is available. This is, of course, the prevailing condition in the rural districts of the whole Union, and it is regrettable that the other provinces are not prepared to make some similar arrangement.

The registration of mission hospitals and institutions controlled by charitable associations is at present entirely voluntary. In almost every such hospital or home certain provision is made for paying patients, the proportion varying from one or two isolated beds to one or two large wards. The fees received from private patients are expended by the controlling body to further its particular religious or charitable work, and in the great majority of cases no other nursing home or hospital is available for the admission of private patients. This is, however, not always the case. Objections to registration have been raised on two points:—(1) that it alters the status of the hospital from an institution conducted for purely charitable reasons to an institution presumably conducted "for gain", and that in consequence (2) drugs and appliances formerly imported free of duty may be taxed. Neither of these objections is a very serious one, and the Department is always consulted on the second one. The reasons in favour of registration have been put forward in previous reports.

In last year's report mention was made of the complete lack of control of private institutions controlled by public bodies, and it becomes more and more difficult to differentiate this class from the first group. Since both classes here mentioned do admit full-paying private patients occasionally in direct competition with nearby private nursing homes, it seems only fair that they should be subject to the same control as a private nursing home registered as such with the Department. Consideration is being given by the Department to an amendment of the regulations which would include satisfactory provision for this class of institution.

The number of nursing homes registered with the Department is given in Table 49.

TABLE 49.—NURSING HOMES REGISTERED WITH THE DEPARTMENT.

Year.	Cape.	Transvaal.	Natal.	Orange Free State.	Total.
1929.....	104	90	43	26	263
1930.....	124	91	54	29	298
1931.....	110	98	51	25	284
1932.....	95	94	44	26	259
1933.....	105	100	46	25	276
1934.....	115	103	43	28	289
1935.....	126	128	42	28	324
1936.....	120	116	46	34	316
1937.....	134	120	49	35	338
1938.....	140	126	55	55	376
1939.....	147	124	61	48	380

Table 50 contains statistics of patients handled by nursing homes.

TABLE 50.—STATISTICS OF PATIENTS HANDLED BY NURSING HOMES.

Province.	Admissions.		Discharges.		Deaths.		Operations.		Confinements.		Deaths of Infants.		Still Births.		Miscarriages and Abortions.		Out-Patients Treated.		Confinements attended outside Homes.	
	Eur.	Non-Eur.	Eur.	Non-Eur.	Eur.	Non-Eur.	Eur.	Non-Eur.	Eur.	Non-Eur.	Eur.	Non-Eur.	Eur.	Non-Eur.	Eur.	Non-Eur.	Eur.	Non-Eur.	Eur.	Non-Eur.
Cape.....	13,483	3,239	13,460	3,031	380	135	5,994	363	3,340	358	60	48	124	38	28	12	1,783	4,490	760	552
Transvaal.....	28,310	4,607	28,356	3,995	443	101	10,968	464	4,556	632	76	124	3	14	244	2	952	9,641	1,489	124
Natal.....	14,733	5,685	14,468	8,553	283	492	6,168	1,519	1,696	1,873	41	43	43	59	82	55	128	12,237	167	345
O.F.S.....	1,411	87	1,312	55	40	11	544	16	603	1	12	21	60	172	45	4	345	13	262	9
TOTALS.....	57,937	13,618	57,596	15,634	1,146	739	23,774	2,362	10,195	2,864	189	236	230	283	399	73	3,208	26,381	2,678	1,030

33.—DISTRICT NURSING SERVICES.

The district nursing services established under Act No. 57 of 1935 continue to expand, but the expansion has been subject to a certain limitation imposed upon it by the shortage in the Union of trained nurses and midwives.

Nurses and midwives, European, Coloured and Native, are found in various fields of work, viz.—

- (1) in private practice;
- (2) on the staffs of Provincial and State-aided hospitals;
- (3) on the staffs of private nursing homes, mission hospitals and institutions run by public bodies;
- (4) in the employment of various departments, e.g. Departments of Agriculture and Forestry, Lands, Social Welfare, as full-time employees.

There is, in addition, a large number of trained nurses and midwives who have married and automatically retired from practice.

It is difficult to estimate what number of trained nurses or midwives is actually available in the Union, since registration with the South African Medical Council is not compulsory (although it is required by many employing bodies as a condition of employment, and by the Department in the case of all district nurses who are employed or subsidised under the Act).

There is a definite shortage of doubly trained nurses in the Union; but not of European midwives with the single qualification, if the existing channels for employment of such are considered. For district nursing posts in rural areas doubly trained women are required, and in far too many instances only a midwife can be secured. The isolation, the distance from the nearest medical aid and the nearest hospital, difficulties of transport, lack of means of communication, all make it imperative for the rural district nurse to be as experienced and as well qualified a person as possible.

The bulk of the practical district nursing work, however, is midwifery, and if sufficient midwives were to be provided to deal with the needs of the population as a whole, many more would be employed than are at present available.

Suggested means of dealing with the position have been—

- (1) provisions of further training facilities;
- (2) establishment of preliminary training schools;
- (3) shortening of period of training;
- (4) abolishment of payment of premiums demanded from a pupil midwife;
- (5) payment of small salary to pupil midwives as to probationer nurses;
- (6) as an immediate measure to relieve the situation, importation of trained nurses from overseas.

The greatest difficulty is experienced in obtaining suitably trained Coloured nurses, owing chiefly to the absence of training schools for these women.

The question of shortage of nurses must be considered as it affects the whole available supply in the Union, and not as it affects only the district nursing services, with which the Department is particularly concerned. Particular difficulty is, however, experienced in procuring suitable women for this work, owing to the many obvious discomforts and disadvantages to which they are exposed, of which the chief are the loneliness and isolation from medical help and the primitive living conditions. Another great drawback to the individual nurse is that the district nursing service is not pensionable, in contrast with employment in a Government or State-aided hospital. In this respect it must be remembered that members of the Trained Nurses' Association can get very favourable rates for annuities and superannuation funds from insurance companies.

Table 51 gives the position of the district nursing service at June, 1939.

TABLE 51.—DISTRICT NURSING SERVICE: NURSES, MIDWIVES AND NON-EUROPEAN NURSING ASSISTANTS AS AT 30TH JUNE, 1939, IN RESPECT OF WHOM SUBSIDIES OR PART-REFUNDS OF SALARIES ARE PAID, COMPARED WITH THE TOTALS AS AT 31ST DECEMBER, 1935.

Race.	Part-refunds under section 14 (a).		Subsidies under section 14 (b).		Part-refunds under section 15 (a).		Subsidies under section 15 (b).		Part-refunds to Provincial Administrations under section 13.	
	1935.	1939.	1935.	1939.	1935.	1939.	1935.	1939.	1935.	1939.
European.....	23	87	7	69	—	13	—	—	—	93
Native.....	2	9	—	—	11	38	3	32	}	
Coloured.....	—	5	1	4	—	—	—	1		
ALL RACES.....	25	101	8	73	11	51	3	33	—	104

District Nursing Service in terms of section 13 of Act No. 57 of 1935—Cape Province.

There has been considerable expansion under hospital boards of district nursing services in the Cape Province, where four new hospital boards have actually inaugurated such services, and several other smaller boards are making arrangements to do so.

A certain amount of dissatisfaction is felt over the control of some of these services. On the whole, however, the services are very satisfactory and excellent work is carried out.

Orange Free State and Natal.

No further appointments have been made in these two provinces under section 13 of Act No. 57 of 1935. A district nursing service has been established at Vryheid, but not in accordance with the provisions of the section, so that no payment can be made by the Department towards this particular service.

In Durban the district nursing service formerly financed by the King Edward VII Order of Nurses has been taken over and incorporated in the district nursing services run in conjunction with Addington Hospital, in order to rank for subsidy under section 13.

Transvaal.

Disappointingly little progress has been made in the Transvaal, only one additional hospital board, Rustenburg, having actually started a service, although negotiations have been carried on for months with several other boards. It is hoped that the very excellent start made by Rustenburg will act as a stimulus and an example to other boards in the province.

District Nursing Service in terms of section 14 of Act No. 57 of 1935.

Under this section, both 14 (a) and 14 (b), there has been a steady increase in appointments, and it is satisfactory to note that there have been more new appointments under section 14 (a) than under 14 (b), since experience has proved that the difficulties of successful administration with the latter type of appointment, i.e. a subsidised private nurse, are infinitely greater than those encountered with the former type, i.e. a refund on a salaried nurse. There is no doubt that a district nursing service composed entirely of full-time salaried nurses would be much more satisfactory to all concerned than one which includes both salaried nurses and those who are still private nurses, though subsidised by the Government.

District Nursing Service in terms of section 15 of Act No. 57 of 1935.

Expansion in Native nursing services has taken place mainly in the form of increased subsidies under section 15 (b) in the Native territories. The provisions of section 15 (a) are, as they stand, of little practical use to Native reserves and territories, where the rural populace cannot in any circumstances raise the required two-thirds of a salary. This section is therefore used only by missions and charitable associations carrying out Native health work; there has been a satisfactory number of new appointments thereunder.

In the Native territories other means of financial assistance have to be employed. A certain number of special appointments was agreed to by the department in the form of subsidies under section 15 (b) of the Act, amounting practically to salaries, board, lodging and incidental expenses being provided locally. Few Native nurses have any particular experience in district nursing, and they are faced with the difficult task of acting as pioneers, first educating the local Natives to desire and seek trained nursing assistance, and then providing the assistance.

A Native nurse placed in such circumstances, working independently of European supervision, except what can be provided by a Native Commissioner and the occasional visit of a district surgeon, needs to possess tact, common sense and honesty of purpose to an unusual degree, if she is to make a success of her job. As far as her practical work goes, she can be of most use in the following directions:—

- (1) As a trained midwife.
- (2) To render first-aid and general emergency treatment.

- (3) To visit the kraals and give general instruction in the fundamental rules of healthy living.
- (4) To act as an intelligence officer for the district surgeon, keeping him informed as to the necessity for special visits, and carrying out such instructions as he may give her.

Native education in health matters is of primary importance, and whereas a great deal of progress in this direction has been made in the large urban areas, the rural areas which include the large Native reserves and territories, have as yet been left practically untouched; and Native nurses are an important part of any campaign to improve general health conditions.

Transport difficulties still loom large in rural nursing services, and will continue to do so until such time as legal provision can be made for subsidising the provision of transport for district nurses. This is an essential requirement for any rural service.

A suggestion has been put forward by various women's associations that some form of "post-graduate" course of training be provided for district nurses, or that some special instruction in this particular branch of work be incorporated in their training. The disadvantage of the latter suggestion is that such an addition would inevitably lengthen the time of training for the general course, and so automatically increase the immediate shortage of nurses. The midwifery course is admittedly too short in this country to produce a midwifery qualification which is of a sufficiently high standard. The South African Medical Council has already decided to lengthen the course. Interpretation of any extra "special" training, as for example that suggested above, could not be considered, and a great many of the district nurses now employed hold only the midwifery qualification.

The suggestion to organise a special "post-graduate" course of training is receiving the attention of the Department.

VII.—PORT HEALTH ADMINISTRATION.

34.—PORT HEALTH ADMINISTRATION.

A summary of the health measures carried out is contained in Table 52.

TABLE 52.—PORTS OF THE UNION: HEALTH MEASURES DURING THE YEAR ENDED 30TH JUNE, 1939.

Particulars.	Capetown.	Durban.	Port Elizabeth.	East London.	Mossel Bay.	Knysna.	Port St. Johns.	Simonstown.	Port Nolloth.	Total.
Vessels dealt with.....	1,815	1,592	934	758	474	22	—	22	152	5,769
Cases of infectious or communicable diseases dealt with.....	248	260	2	3	—	—	—	—	—	513
No. of Vessels involved.....	125	135	1	2	—	—	—	—	—	263
Disinfections and fumigations—										
Vessels.....	39	93	1	1	—	—	—	—	—	134
Consignments of second-hand clothing and other articles.....	4	284*	1	—	—	—	—	—	—	289
Deratizations under International Sanitary Convention—										
No. of Vessels Deratized and Certificates Issued	7	81	—	—	—	—	—	—	—	88
No. of Exemption Certificates Issued.....	11	45	—	—	—	—	—	—	—	56
Rats Destroyed on Vessels and in Dock Area.....	2,301	3,798	1,985	1,885	5	—	—	—	—	9,974

* In addition, the bedding and personal effects of 799 Indian passengers were disinfected.

The extension of the Capetown docks is proceeding rapidly. When completed the New Basin will cover 270 acres of water, and 365 acres of reclaimed land will have been added to the foreshore. These changes will produce entirely new conditions at the Capetown harbour affecting the port health organisation in common with other services.

The port health officer reports that the incidence of measles on ships in transit has dropped considerably. Cases of venereal disease on ships showed a marked increase at this port. No formidable disease cases were introduced, though a case of smallpox from a crew was landed.

Various sanitary improvements in dealing with refuse, disposal of night-soil, and general port cleanliness have been achieved during the year.

Rodent control has been strictly maintained and the work of rodent proofing harbour premises and works was continued.

At Durban no formidable epidemic disease cases were introduced. Two ships with a history of smallpox were given full pratique when investigation revealed their freedom from infection. The port health officer usually makes enquiries as to the presence of cases of venereal disease on board ship, and assists patients to secure treatment either at the local hospital or special clinic.

The usual care in regard to anti-plague work has been maintained. Rodent proofing of buildings in the harbour area, trapping of rodents and guarding of ships have been continued by the rodent gangs.

The usual harbour refuse and cleaning works have been carried out. Harbour construction and improvements have hampered work during the year.

The flying boat service has resulted in the port health officer and his staff being charged with new duties and responsibilities. Passengers arriving from suspected yellow fever areas were subjected to medical surveillance by medical officers of health in their towns of destination.

It was decided in June to close down the leper station at Salisbury Island (except for occasional cases of leprosy discovered in Durban itself).

In Port Elizabeth harbour the anti-plague work, accelerated as the result of the outbreak of plague in the municipal area last year, has been continued. Stores and buildings have been surveyed and the appropriate measures, demolition or rodent proofing, put in hand. Neither at this port nor at East London did any formidable epidemic disease cases occur. At East London improvements have been secured in rodent control in the port.

Conference of Port Health Officers.

On the 27th June a conference of port health officers met in Pretoria. Dr. C. G. Booker, Deputy Chief Health Officer (Railways), also attended. Its findings, which it is anticipated will clear the way to more efficient and smoother port health administration, are summarised here: As the Minister of Public Health is the local authority for port areas in terms of section 158 of the Public Health Act, No. 36 of 1919, and as the port health officer is the local representative and official of the Union Department of Public Health, he acts as medical officer of health for the area. To prevent any possibility of pollution of water supplies to shipping, hydrant, hoses, watering staffs and methods should come under the general health supervision of port health officers as should also the port and harbour cleansing and sanitation services.

VIII.—LABORATORY SERVICES.

35.—DEPARTMENTAL LABORATORY SERVICES.

The work done by the Government laboratories at Capetown and Durban and that carried out on behalf of the Government at the South African Institute for Medical Research, Johannesburg and Port Elizabeth, is shown in Table 53.

TABLE 53.—PATHOLOGICAL LABORATORIES: ANALYSES AND EXAMINATIONS, YEAR ENDED 30TH JUNE, 1939.

Particulars.	Laboratories.		South African Institute for Medical Research.	
	Capetown.	Durban.	Jo-hannesburg.	Port Elizabeth Branch.
<i>Specimens Examined for—</i>				
Government Departments—				
Agriculture.....	14	—	(a)	—
Customs and Excise.....	24	—	—	—
Defence.....	481	100	1,424	—
Interior (Mental Hospitals, etc.).....	696	689	1,491	670
Justice.....	—	287	1,476	347
Prisons.....	1,192	400	2,902	13
Mines (including Miners' Phthisis).....	—	—	15,889	—
Posts and Telegraphs.....	—	—	—	—
Public Health (including Leper Institutions).....	12,392	7,939	64,836	8,152
Public Works.....	8	—	—	—
South African Railways and Harbours	72	1,109	—	—
Other Government Work.....	14	83	619	108
General Hospitals (Provincial).....	4,835	16,899	47,992	11,035
Local Authorities.....	55,573	8,931	6,379	35,764
Medical Practitioners.....	15,849	13,789	15,053	2,287
Department of Education (Provincial).....	—	1,084	—	—
Other Governments or Administrations.....	599	—	4,927	—
Others.....	—	—	22,937(b)	17
TOTAL.....	91,749	51,310	185,925	58,393
<i>Manufactures and Issues—</i>				
Autogenous Vaccines.....c.c.	50	—	26,800	4,125
Bacterial Vaccines (stock).....c.c.	—	—	681,000	(d)
Tuberculin Dilutions.....c.c.	—	—	—	110
Sera (various), Bacterial Filtrates.....c.c.	—	—	824,346	(d)
Anti-rabic Vaccine.....c.c.	17,350	—	—	—
Chaulmoogra Oil Preparations.....c.c.	13,750	—	—	—
Smallpox Vaccine—Calf Lymph (prepared at Vaccine Institute, Rosebank).....tubes	2,700,000(f)	—	418,784	475
Others.....doses	303,700(e)	—	69,367(c)	—
Attendances at Courts of Law by Members of Staff.....	350	1	5	1
Total Days' Absence entailed by such attendances.....	219	2	36	6

(a) Included in other Government work.

(b) Includes 22,060 examinations for the Mining Industry.

(c) Oral vaccines.

(d) Included in Johannesburg figures.

(e) Iodized ethyl esters.

(f) 2,407,874 tubes issued.

Generally the laboratory services are the same in extent and nature as fully described in the last annual report of the Department. As foreshadowed then a laboratory has been opened at the Frere Hospital, East London. This institution is undertaking departmental work from the neighbouring districts and is a very useful addition to the regional laboratory services of the Union.

Various difficulties of administration and finance which occur in connection with the provision of pathological and other laboratory services have again led to the conclusion voiced in last year's report that a unified service is required. Such a unified national laboratory service would have obvious advantages other than those merely of administrative convenience. The national needs could be met by a planned distribution of facilities. The full assistance and support of the whole organisation would become available to all communities, local authorities and individuals seeking laboratory aid. The duplication and overlap of certain services could be avoided and the money and personnel so saved used for the general improvement of the whole organisation. Efficiency and economy would be served by such amalgamation and unification; while as a career for medical officers and technical assistants, pathology, bacteriology and other laboratory subjects will have greater appeal and will become more attractive than has been the case in the past.

36.—BIOLOGICAL CONTROL LABORATORIES.

During the year under review an increased number of examinations was carried out under the Therapeutic Substances Regulations. Those carried out under the Food, Drugs and Disinfectants Act, No. 13 of 1928, showed a slight decrease.

One additional licence to manufacture bacterial vaccines for sale was issued. Additional import licences were granted to importers to enable them to import therapeutic sera, antigens and bacterial vaccines, insulin, pituitary (P.L.) extract, sterilised surgical ligatures, hormone preparations, and vitamin preparations, into the Union. The licences granted for the importation of the last two groups of therapeutic substances were required following the promulgation of an Amendment of the Therapeutic Substances Regulations published under Government Notice No. 1997 of November 30th, 1938. Seven licences to import therapeutic substances were cancelled during the year and have not been renewed.

All laboratories in the Union carrying out the manufacture of therapeutic substances including autogenous vaccines, were inspected during the year. The premises of all agents granted licences to import therapeutic substances into the Union were also inspected. In several cases importers were found to be keeping unsatisfactory records and in one case the refrigeration plant was found to be inadequate to hold the stock carried by the importer.

The Department had no option but to cancel several licences to import therapeutic substances, because the manufacturers, despite repeated warnings, had refused to comply with the labelling requirements laid down in the Therapeutic Substances Regulations. The number of licences in force under the Regulations on the 30th June, 1939, is shown in Table 54 as also the additional licences granted during the year 1938-39 and the licences cancelled during the same year. The Table also shows the number of permits to import vitamin preparations granted under the Amendment Therapeutic Substances Regulations published under Government Notice No. 1997 of 30th November, 1938.

TABLE 54.—LICENCES ISSUED UNDER THE THERAPEUTIC SUBSTANCES REGULATIONS.
(Government Notice No. 1131 of 1935.)

Therapeutic Substance.	Manufacturing Licences.			Import Licences.			Research Licences.			Vitamin Permits.
	Issued 1938-39.	Cancelled 1938-39.	In Force 30/6/39.	Issued 1938-39.	Cancelled 1938-39.	In Force 30/6/39.	Issued 1938-39.	Cancelled 1938-39.	In Force 30/6/39.	Issued 1938-39.
Antitoxic and anti-bacterial sera.....	—	—	2	7	2	10	—	—	9	—
Antigens and bacterial vaccines.....	1	—	13	5	2	14	—	—	9	—
Arsphenamines and derivatives.....	—	—	—	—	—	7	—	—	9	—
Insulin.....	—	—	—	3	1	15	—	—	9	—
Pituitary (Post. Lobe) Extract.....	—	—	—	1	1	14	—	—	9	—
Sterilised Surgical Ligatures and Sutures.....	—	—	—	2	1	7	—	—	9	—
Hormones and hormone preparations.....	—	—	—	7	—	7	—	—	—	—
Vitamins and vitamin-containing preparations.....	—	—	—	2	—	2	—	—	—	7

A total of 197 samples of therapeutic substances was examined. These examinations were carried out under the Therapeutic Substances Regulations and Therapeutic Substances Amendment Regulations published under Government Notice No. 1131 of 9th August, 1935, and No. 499 of 2nd April, 1937. The results of the examinations are shown in Table 55.

TABLE 55.—EXAMINATIONS CARRIED OUT UNDER THE THERAPEUTIC SUBSTANCES REGULATIONS, YEAR ENDED 30TH JUNE, 1939.

Name of Product.	Manufactured in Union. No. examined.	Imported into the Union. No. examined.	No. un- satisfactory.
Bacterial Vaccines.....	57	20	—
Schick Test Toxin.....	26	1	5
Diphtheria Prophylactic.....	7	1	2
Tuberculin.....	—	2	1
Diphtheria Antitoxin.....	12	5	1
Tetanus Antitoxin.....	5	3	—
Arsphenamine and Derivatives.....	—	12	—
Gas-Gangrene Antitoxin.....	2	—	—
Anti-Pneumococcus Serum Types I and II.....	1	—	—
Anti-Dysentery Serum (Shiga).....	3	—	—
Insulin.....	—	14	—
Pituitary (P.L.) Extract.....	—	14	1
Sterilised Surgical Sutures.....	—	12	—
TOTAL.....	113	84	10

Ten of the samples examined were found to be unsatisfactory. Five samples of Schick Test Toxin were inactive. Tests carried out on these Schick Test Toxins in the Biological Control Laboratories and in the manufacturer's laboratories showed that the toxins retained their potency when stored on the manufacturer's premises. When examined in the Biological Control Laboratories, however, these toxins gave negative reactions. The cause of these discrepancies is still being investigated. All tests of Schick Test Toxins carried out in the Biological Control Laboratories are carried out on one flank of the test animal. Control tests using a Schick Test Toxin prepared in the Biological Control Laboratories are carried out on the other flank of the same animal. Two samples of diphtheria prophylactic obtained from the one batch examined, were found to be inactive. The manufacturer was notified and the question of withdrawal of the preparation from sale is under consideration. One sample of tuberculin was refused entry into the Union. On examination, it was found that it did not comply with the requirements laid down in the regulations relating to tuberculin. A sample of diphtheria antitoxin was found to be deficient in potency. A second sample from the same batch was found to be satisfactory, however, and no further action was taken. A sample of pituitary (posterior lobe) extract was found to be of low potency. The importer was required to withdraw all stocks from sale and to recall all stocks which had already been sold.

The results of examinations carried out under the provisions of subsection (1) of section 5 of Act No. 13 of 1929 are shown in Table 56.

TABLE 56.—EXAMINATIONS CARRIED OUT UNDER THE FOOD, DRUGS AND DISINFECTANTS ACT, No. 13 OF 1929.

Name of Product.	No. Examined.		No. Unsatisfactory.	
	1937-38.	1938-39.	1937-38.	1938-39.
Digitalis Powder.....	4	—	1	—
Tincture of Digitalis.....	42	35	2	1
Tincture of Strophanthus.....	34	36	15	14
Adrenaline B.P.....	—	1	—	—
TOTAL.....	80	72	18	15

It will be seen that the improvement in the quality of digitalis preparations sold in the Union, which was noted in 1938, has been maintained. Unfortunately a large number of the samples of tincture of strophanthus examined, were unsatisfactory. A number of these tinctures possessed a potency considerably higher than that of the standard preparation. The danger of using such potent preparations of unknown strength is only too obvious. The need for continuation of a strict departmental control over the potency of tincture of strophanthus sold in the Union is emphasised by the results of the examinations recorded in Table 56.

On March 1st, 1939, a control over the potency of cobra antivenenes sold in the Union was instituted under the powers conferred by section I' of Part IV of the Second Schedule of the Therapeutic Substances Regulations promulgated under Government Notice No. 1131 of the 9th August, 1935. All cobra antivenenes manufactured in the Union after March 1st, 1939, are required to have their potency stated on the label of the ampoule in terms of the provisional unit for cobra antivenene as defined in a memorandum circulated to manufacturers by the Department. Further, all antivenenes are required to be standardised in relation to a provisional standard antivenene, a supply of which is kept in the Biological Control Laboratories.

The effect of the introduction of this control is to enable purchasers of cobra antivenenes sold in the Union to know the potency of the preparation sold. In the past, samples of cobra antivenene have been sold in the Union, which possessed little or no potency. This lack of potency was not, however, evident to the purchaser before use, as no official control over the potency of these preparations was exercised.

Investigations into methods of control of puff-adder antivenene are still in progress. It is hoped that it will be possible in the near future to introduce a provisional unit and standard preparation for the assay of puff-adder antivenene.

On the 30th November, 1938, amendment regulations controlling the potency and purity of vitamin A, B₁, C and D preparations, and of oestrogenic, androgenic and progestational hormones and preparations possessing oestrogenic, androgenic and progestational activity, were promulgated. These amendment regulations require that the labels of the preparations schedule therein must state the potency of the preparation in international units and must also state for what period the preparation will retain its potency. Further the importation of these preparations into the Union is restricted by licence or permit.

Recent nutritional research has revealed that apart from frank vitamin deficiencies, which are relatively uncommon, a condition of subclinical malnutrition may exist amongst all classes of the population. The realisation of this state of affairs has led to the development of a host of vitamin preparations which are recommended for the treatment of frank or sub-clinical vitamin deficiencies. Some of these preparations are unstable and will not retain their potency for an indefinite period. It is hoped that the promulgation of the amendment regulations controlling vitamin preparations will enable a control to be exercised over the potency of these preparations.

It should be pointed out that accurate quantitative estimations of vitamins A, B₁, C and D in foods can at present best be carried out by biological methods. The content of these vitamins in many South African foodstuffs is unknown at present, and there are sound reasons for believing that a survey of the vitamin content of South African fish liver oils, and other foodstuffs, which could be carried out in the Biological Control Laboratories would reveal a rich source of these essential accessory food factors.

Just as the potency of certain vitamin A, B₁, C and D preparations can only be assayed by biological methods, so quantitative examinations of sex hormone preparations can also be carried out only by biological methods using international standard preparations of the hormones for comparison purposes.

During the year the Biological Control Laboratories co-operated in an international scheme organised by the Department of Biological Standards of Great Britain, with a view to determining whether certain hormone preparations were suitable for use as international standards. Several specimens were examined and reports thereon submitted to the Director of Biological Standards of Great Britain.

A regular supply of international standard preparations and memoranda was obtained during the year from the Department of Biological Standards of the National Institute for Medical Research, London. The close co-operation of this Department was very much appreciated.

The donation of a quantity of cobra antivenene by the South African Institute for Medical Research, for the purpose of establishing a standard anti-cobra serum, and of quantities of androsterone and progesterone by Messrs. Ciba, N. V. Organon, and Schering A. G. for the purpose of establishing national substandards for these hormones is gratefully acknowledged, as is also the donation of supplies of thyrotropic, gonadotropic and chorionic gonadotropic hormones by Messrs. N. V. Organon.

IX.—HOUSING AND SLUM ELIMINATION.

37.—HOUSING AND SLUM ELIMINATION.

Full details of the working of the Housing Act, No. 35 of 1920, and the Additional Housing Act, No. 41 of 1937 (assistance to building societies), from the date of their commencement are contained in the report of the Central Housing Board for the calendar year ended 31st December, 1938 (U.G. No. 29 of 1939), which was laid on the Tables of Parliament. A summary of the position as regards the former Act as at 30th June, 1939, is given in Table 57.

TABLE 57.—HOUSING ACT, No. 35 OF 1920—WORKING FROM PROMULGATION (16TH AUGUST, 1920), TO 30TH JUNE, 1939.

Province.	Loan Applications Approved.			Loan Issues.	Number of Houses.					
	European.	Non-European.	Total.		Completed.	Under Construction.	Approved, but not yet commenced.	Total.	Total for European Occupation.	Total for non-European Occupation.
(A) <i>Economic Housing.</i>	£	£	£	£						
Cape.....	1,648,960	666,949	315,909	2,208,574	7,330	32	366	7,728	2,655 (a)	5,073 (b)
Natal.....	580,756	133,639	714,395	659,213	1,103	68	54	1,225	589	636 (c)
Orange Free State....	631,717	20,618	652,335	617,640	1,670	385	398	2,453	813 (d)	1,640 (e)
Transvaal.....	2,206,102	259,962	2,466,064	2,325,989	4,487	173	657	5,317	2,829	2,488 (f)
TOTAL.....	5,067,535	1,081,168	6,148,703	5,811,416 (g)	14,590	658	1,475	16,723	6,886	9,837
(B) <i>Sub-Economic Housing.</i>										
Cape.....	809,246	2,030,501	2,839,747	1,364,159	3,531	2,209	3,176	8,916	1,783	7,133
Natal.....	—	340,025	340,025	171,286	544	187	271	902	—	902
Orange Free State....	4,900	—	4,900	4,900	1	1	8	10	10	—
Transvaal.....	983,417	1,521,475	2,262,784	1,623,415	4,547	423	1,659	6,629	1,221	5,408
TOTAL.....	1,797,563	3,922,033	5,719,596	3,163,760	8,523	2,820	5,114	16,457	3,014	13,443
(C) <i>Housing of the Aged Poor.</i>										
Cape.....	22,472	16,973	39,445	11,113	42	—	175	217	81	136
Natal.....	25,000	—	25,000	24,999	50	—	—	50	50	—
Orange Free State....	6,000	—	6,000	1,600	—	—	28	28	28	—
Transvaal.....	27,500	—	27,500	4,483	8	3	12	23	23	—
TOTAL.....	80,972	16,973	97,945	42,195	100	3	215	318	182	136
TOTAL (A), (B) and (C)	6,946,070	5,020,174	11,966,244	9,017,371	23,213	3,481	6,804	33,498	10,082	23,416

(a) Includes a hostel to accommodate 86 persons.
(b) Includes 1,337 single rooms in blocks, 8 barracks and 160 flats.
(c) Includes 3 barracks and 36 single rooms in blocks.
(d) Includes a hostel for European girl employees at Bloemfontein.
(e) Includes 24 single rooms in blocks, the balance of 845 representing the approximate number of dwellings to be built out of a total loan of £16,818 made to three Local Authorities for use exclusively in purchasing materials to be advanced to Coloured persons and Natives building their own homes.
(f) Includes 303 single rooms in blocks, 3 compounds and 13 hostels.
(g) Includes £1,905,628 re-issued out of repaid capital.

The activity on the part of local authorities in dealing with bad and insufficient housing, referred to in last year's report, has continued during the present year. The number of schemes and dwellings approved in respect of economic housing involved loans totalling £636,522 as compared with £613,879 for the corresponding period in 1938, whilst the corresponding figure for sub-economic loans was £846,484 compared with £2,921,854 in 1938. The decrease in the sub-economic figure is solely due to the funds which the Government agreed to make available having been fully allotted, consequently a number of applications submitted by local authorities for loans could not receive consideration.

Applications for loans under the Additional Housing Act, No. 41 of 1937, the provisions of which were fully set out in last year's report, exceeded all expectations, and the total amount involved was in excess of the provisions made on the estimates and necessitated further funds having to be voted by Parliament on the additional estimates.

Economic Housing.—The Government's commitment for economic housing remains at £5,000,000, the whole of which has been fully allotted. During the year the Treasury agreed to restore to the Capital Fund an amount of £1,282,958, less £154,958 which has been retained by the Public Debt Commissioners in the Local Loans Fund, and which had been repaid to the Treasury by Provincial Administrations from capital repayments in order to reduce their own indebtedness. In agreeing to restore the sum of £1,128,000 the Treasury stipulated that it should be spread over a period of five years. The total sum allotted to local authorities out of economic funds from the commencement of the Act to 30th June, 1939, amounts to £7,319,153, which is made up of the £5,000,000 mentioned above and the balance, £2,319,153, out of capital repayments made to the different Provincial Administrations by local authorities.

Of the £5,000,000 commitment the sum of £3,905,788 has been issued whilst in addition £1,905,628 has been issued out of capital repayments by the Provincial Administrations, making the total issues for economic housing up to 30th June, 1939, £5,811,416. A sum of £750,000 since reduced to £600,000, has been made available for issue during the present financial year ending 31st March, 1940, and in addition it is estimated that the Provincial Administrations will have a sum of £134,250 available for re-issue out of capital repayments during the year.

As hinted in last year's report, with the increasing activities on the part of local authorities, the time is not far distant when the available funds will be exhausted. It may well be noted here that the only funds which will be available in the future, unless the Government agree to increase its commitment, will be the remaining instalments of the £1,128,000 to be restored by the Treasury, of which two have already been taken up and a third instalment asked for, and the amount which will be available for reissue out of capital repayments; the latter for practical purposes can be estimated at approximately £130,000 per annum.

There has been no change as regards the limits of the cost of constructing dwellings and the maximum loan which can be granted as set out in last year's report.

Sub-economic Housing.—In March, 1938, the Government agreed to provide an additional £3,000,000 for sub-economic housing, thus bringing its total commitment up to £13,000,000. The whole of this amount with the exception of a negligible balance has been fully allotted. A number of local authorities has submitted applications for loans, totalling approximately £1,000,000, which cannot receive consideration owing to lack of funds, and in addition to the applications on hand, it is known that others are desirous of obtaining loans but have not submitted any definite application as they are aware that funds are not available. Up to the end of the period of this report an amount of £3,163,760 has been issued to local authorities. Full details regarding the loans already granted to the different local authorities throughout the Union will be found in the annual report of the Central Housing Board.

Additional Housing Act, No. 41 of 1937.—This Act was promulgated on 23rd May, 1937, and empowers the Government to advance moneys, subject to certain conditions, to approved building societies for the purpose of assisting persons to obtain a loan for the construction of a dwelling. The Act permits of a building society to advance out of its own funds an amount not exceeding 60 per cent. of the cost of the dwelling, the Government advances 30 per cent. whilst the applicant is himself required to provide the remaining 10 per cent. The rate of interest charged by the society on the proportion advanced out of its own funds is the rate charged on all building loans granted in the normal course of its business, whilst the rate charged on the proportion advanced by the Government is 3½ per cent., the combined mean rate works out at 5½ per cent. Building societies desirous of participating in this scheme must first enter into a deed of agreement with

the Minister, the provisions of which have been approved by the Central Housing Board in consultation with the Treasury. At 30th June, 1939, agreements had, with the approval of the Treasury, been entered into with 18 societies carrying on business in different parts of the Union. The number and value of loans granted and the amount advanced by the Government from the date of the commencement of the Act are set out in the following table:—

TABLE 58.—ADDITIONAL HOUSING ACT, No. 41 of 1937.

Name of Society.	No. of Loans.	Value of Loans.			Amount advanced by Government.		
		£	s.	d.	£	s.	d.
Adelaide Mutual Building Society.....	1	1,034	0	0	344	13	4
African Mutual Loan and Savings Society.....	1	950	0	0	250	0	0
Alliance Building Society.....	56	65,933	0	0	21,627	13	4
Colonial Permanent Building Society.....	11	11,772	10	0	3,922	10	0
Natal Building Society.....	130	147,801	10	0	49,178	8	0
Rand Provident Building Society.....	86	95,241	0	0	31,713	6	11
S.A. Permanent Mutual Building and Investment Society.....	257	281,511	16	0	93,705	8	8
Standard Building Society.....	47	51,634	0	0	17,194	6	8
St. Andrews Building Society.....	57	70,421	10	0	23,023	16	8
United Building Society.....	390	408,700	10	0	136,172	13	4
TOTAL TO 30/6/39.....	1,036	1,134,999	16	0	377,132	16	11

Housing of the Aged Poor and Totally Unfit.—The Government agreed to provide a sum of £100,000 for this purpose at the interest rate of 1s. per cent. The whole of the amount has been fully allotted and no further funds are available. Schemes have been or are being carried out at Capetown, Durban, Jamestown, Johannesburg, McGregor, Philipstown, Port Elizabeth and Zastron.

Housing Act, No. 35 of 1920.—During the year the total value of the loans approved amounted to £1,543,176 involving the erection or enlargement of 2,649 dwellings, details of which are as under:—

Economic housing ($3\frac{1}{2}$ per cent. loan funds), loans totalling £636,522. Number of dwellings involved, 884.

Sub-economic housing ($\frac{3}{4}$ per cent. loan funds), loans totalling £846,484. Number of dwellings involved, 1,543.

Housing of the Aged Poor and Totally Unfit (1s. per cent. loan funds), loans totalling £60,170. Number of dwellings involved, 222.

The corresponding figures for the previous year are:—

Economic housing loans, £613,879. Number of dwellings involved, 848.

Sub-economic loans, £2,921,854. Number of dwellings involved, 7,392.

Housing of the Aged Poor and Totally Unfit loans, £37,775. Number of dwellings involved, 96.

Slum Elimination.—The Slums Act, No. 53 of 1934, was extended during the year to two additional centres, Middelburg (Cape) (Proclamation No. 256 of 3rd November, 1938) and Uitenhage (Proclamation No. 118 of 19th May, 1939). The number of centres at which this Act is in force now totals 30.

During the year 25 appeals, involving 49 premises, were lodged under section 4 (10) of the Act against the declaration of single sets of premises as slums. Of these, 24 appeals involving 32 premises were from Johannesburg, 7 appeals involving 12 premises from Port Elizabeth, 1 appeal involving 2 premises from East London and 3 appeals involving 3 premises from Germiston. One appeal lodged from Durban was withdrawn before it had been considered. Since the commencement of the Act, 25th June, 1934, up to 30th June, 1939, a total of 300 appeals involving 1,008 properties has been considered and disposed of. In every case the decision of the local authority in declaring the premises to be slums was confirmed. One appeal against the refusal of the local authority to rescind a slum declaration in terms of section 15 (3) of the Act was received from Johannesburg. The appeal, which concerned a number of properties in the Albertville Township, was not successful. Three applications for the Minister's approval to the acquisition of land in terms of section 17 of the Act were received. One of the applications was from Steynsburg and concerned the acquisition of 21 slum properties, one received from Johannesburg was for the acquisition of

the whole of Albertville Township in which many of the dwellings had been declared slums, whilst the third was from Kingwilliamstown for the acquisition of the Brownlee Mission Station. The last-named was one of the worst slum areas in the whole of the Union and all attempts to get rid of it over a period of years had proved abortive owing to the peculiar circumstances under which the land was vested in trustees.

Non-European Housing in Natal.—The non-European housing in the rural areas of Natal, especially those sections concerned with the sugar industry, the wattle industry and the coal mines, has been showing steady progress during the period under review. The financial position along the sugar-belt in particular, following on a generally successful cane crop, has enabled the employers of labour to expand their provision for rehousing the workers and their dependents. The effective anti-malaria control, in spite of widespread proliferation of vectors in the summer and autumn, minimised financial losses directly and indirectly. This was undoubtedly due in part to the improved housing arrangements which greatly facilitated disinfection.

The available figures are of interest. They are indicated below in Tables 59 and 60:—

TABLE 59.—NON-EUROPEAN HOUSING IN RURAL AREAS IN NATAL.

Year.	Estates Inspected.	Notices Served.	Prosecutions.
1935-38.....	403	16	3
1938-39.....	308	3	Nil.

The employers of labour are becoming more and more willing to improve the living conditions of their workers without resort to enforcement of the regulations by the Department.

In the more successful and rapidly developing areas, planters actually vie with each other in erecting better barracks and providing better amenities than their neighbours. This has a twofold effect. Firstly, the pride of possessing sightly and orderly non-European quarters is increasing. Secondly, it is becoming more and more obvious that the labourers themselves prefer to have employment on estates where they receive improved living facilities.

Table 60 indicates the steady progress:—

TABLE 60.—NON-EUROPEAN HOUSING IN RURAL AREAS IN NATAL.

Year.	New Houses Built.	Houses Improved.	Houses Demolished.	Persons Affected.		Dependents.	Total.
				Natives.	Indians.		
1935-38.....	3,364	990	1,942	11,654	2,730	11,586	25,970
1938-39.....	1,222	197	739	6,467	484	1,500	8,451

For financial reasons few individual planters can provide more than the minimum requirements, but it is pleasing to note that the effort towards improved supervision is increasing. A gradual spread of health propaganda has facilitated the Department's efforts to improve water supplies, sanitary facilities and the preparation of food. It has been proved time and time again that adequate and constant supervision provides the best results with the minimum of expenditure. From a health point of view, comparing those properties on which good buildings exist but where the supervision is poor, to the less pretentious dwellings which are cleanly kept together with their orderly environs and amenities, the latter are more desirable in the majority of cases.

Another pleasing feature during the year has been the co-operation of the Rural Licensing Boards in insisting on the improvement of buildings, rodent-proofing of stores, improved sanitation and cleanliness, etc., before granting the necessary permits. In this manner the numerous stores and butcheries in the districts are being greatly improved and modernised. This is essential where commodities such as raw food materials and meat handling are concerned.

Increasing health education and propaganda from every possible source are proving to be of the greatest assistance in achieving those desirable conditions of living for the less enlightened population at which the Department aims. Perseverance by employers has shown that the non-European is able to accept reasonable civilised standards of cleanliness and conduct provided that some facilities are offered and that adequate supervision is exercised.

X.—MEDICAL, DENTAL AND PHARMACY MATTERS.

38.—THE SOUTH AFRICAN MEDICAL COUNCIL.

Résumé of Business for the Year Ended 30th June, 1939.

The ordinary half-yearly meetings of the Council were held in September, 1938, and March, 1939, and in addition a special meeting was held in January, 1939.

The Executive Committee has met 11 times during the year, the Nurses, Midwives and Masseurs, Education, Examination and Registration Committee 6 times, the Medical, Dental Education, Examination and Registration Committee 4 times, besides which a meeting of a special disciplinary committee was held. Various other meetings of sub-committees were held as occasion required.

During the year the following registrations were effected:—

Medical Practitioners	201
Dentists	16
Medical Students	247
Dental Students	10
Nurses	704
Midwives	507
Masseurs	17

In addition the following were restored to the register after having been erased owing to their addresses being unknown:—

Medical Practitioners	19
Dentists	7
Medical Students	2
Nurses	133
Midwives	143
Masseurs	1

Of the medical practitioners registered by the Council, 154 had qualified at the South African medical schools and of the remainder a number were South Africans who had proceeded oversea for the prosecution of their studies; of the dentists registered 7 had qualified at the University of the Witwatersrand; of the nurses registered 478 were registered after passing the Council's examinations and obtaining its certificate of competency. Similarly 355 midwives were registered after passing the Council's examinations and obtaining its certificate of competency.

A considerable number of nurses continues to come into the Union from overseas; of the nurses registered, 226 held certificates from countries outside the Union, and of these 111 came from England and Wales, 33 from the Netherlands, and the remainder principally from Australia, New Zealand and Canada.

The number of persons whose names appeared in the various registers on the 30th June, 1939, were as follows:—

Medical Practitioners	3,148
Dentists	739
Medical Students	1,151
Dental Students	19
Nurses	6,162
Midwives	4,260
Masseurs	84
Dental Mechanics	119

Examinations for nurses were held quarterly and for midwives half-yearly. The following table shows the number of candidates who presented themselves for the various examinations and the numbers who passed:—

TABLE 61.—SOUTH AFRICAN MEDICAL COUNCIL: CANDIDATES WHO PRESENTED THEMSELVES FOR EXAMINATION.

	Presented.	Passed.
Medical and Surgical Nurses.....		
Final.....	389	376
Preliminary.....	777	585
Male Nurses.....		
Final.....	17	17
Preliminary.....	25	17
Mental Nurses.....		
Final.....	79	65
Preliminary.....	229	156
Nurses for Mental Defectives.....		
Final.....	21	20
Preliminary.....	52	36
Midwives.....	413	355

Since the promulgation of the Council's rules for the registration of specialists on the 24th June, 1938, a large number of applications for registration has been considered. A number of these was registered in terms of a provision in the rules whereby anyone practising as a specialist prior to the promulgation of the rules could be registered on making formal application, but many others have been considered and it has been necessary to go into the qualifications and experience of the applicants fully in order to ascertain whether they complied with the Council's requirements. The number of specialists registered during the year amounted to 321, which is equivalent to slightly more than 10 per cent. of the total number of medical practitioners appearing in the register. On the whole the rules appear to have been welcomed and it is felt that they will be to the advantage, not only of the profession, but also to that of the public.

The Council has considered various cases of alleged unprofessional conduct on the part of registered practitioners, but it was only necessary in the case of one medical practitioner to hold a formal enquiry, which resulted in the practitioner concerned being found guilty and sentenced to a caution and a reprimand.

An enquiry was also held into the conduct of a dentist; the Disciplinary Committee which dealt with the case recommended that his name be erased from the register of dentists, but that the sentence be suspended for a period of 12 months subject to good behaviour during that time. This recommendation has subsequently been confirmed by the Council.

An enquiry was also held into the conduct of a registered midwife; she was sentenced to a caution.

The Council has considered two applications for restoration to the register of medical practitioners from doctors who had been struck off the register, and in both cases resolved to refuse the applications.

During the year under review, a committee was appointed by the Minister to investigate and report upon the medical training in South Africa. Its terms of reference were as follows:—

To investigate and report upon the following matters:—

- (1) Whether the facilities for medical training in South Africa at present available are sufficient and adequate, having regard to the present and prospective future needs of the various sections of the Union's population.
- (2) What steps should be taken to remove such weaknesses as may be found to exist at the existing medical schools, and in this connection whether steps should be taken to fix a quota of students at such schools.
- (3) If it is found to be necessary to expand the existing facilities, whether, having regard to the financial and all other relevant considerations, this could most suitably and appropriately be done at existing medical schools or by the establishment of an additional school or schools, and in the latter event what centre, or centres would be most suitable for the purpose.

The committee reported in due course, and the following is a summary of its main recommendations:—

- (1) In any reorganisation of medical training in South Africa the opportunity should be seized of still further introducing the preventive idea at all stages of the course.
- (2) The standard in the pre-medical sciences should be raised rather than lowered, and students should be encouraged to take a degree in science either prior to or concurrently with their medical course.
- (3) University authorities should consider taking steps to obtain the right to eliminate undesirable students.
- (4) An expert on medical education from Europe or America should be invited to investigate and report on the whole problem of the medical curriculum in South Africa.
- (5) A year of compulsory internship prior to registration should be instituted.
- (6) More attention should be paid to the training of specialists, post-graduate instruction, and research.
- (7) Full-time deans of medical faculties should be appointed.
- (8) The professors of medicine, surgery, and obstetrics and gynaecology should be full-time without private practice.

- (9) The Union Government should finance the extra cost incurred by teaching hospitals in providing for the clinical training of medical students.
- (10) An Afrikaans medical faculty should be established at Pretoria and the existing schools should be brought up-to-date in regard to staff, accommodation and equipment.
- (11) Provision should be made for the clinical training of non-European students in South Africa, and facilities for training of medical aids should be expanded as the demand increases.
- (12) The financial implications should receive the early and earnest consideration of the Government.

The Council has since considered the report in so far as it affects its functions. The matter is being further investigated.

It was decided to enter into reciprocal relations for the registration of medical practitioners with India, and certain qualifications of the Universities of India have been added to the list of qualifications recognised by the Council under section 22 of Act No. 13 of 1928. The Council has further added the qualifications which may be registered by British subjects who were born in the Union, or who were domiciled in the Union when they commenced their professional studies and proceeded therefrom for the purpose of prosecuting their studies, the medical qualifications of Sweden. The Council has also recognised a number of additional qualifications which may be registered by medical practitioners whose names already appear in the register.

It has been agreed in principle that when the Medical, Dental and Pharmacy Act is amended that the University of the Witwatersrand should be entitled to appoint a dentist to the Council in the same way as the medical schools in South Africa appoint a medical practitioner each as representing them.

A petition forwarded to the Minister praying for the establishment of a nursing council or board was referred to this Council for consideration, and it was unanimously resolved that it was not in the best interests of the public, or of the medical or nursing professions in South Africa, that a nursing council should be instituted.

A number of hospitals has been added to the list of training schools for nurses recognised by the Council; various existing training schools have been inspected from time to time, and any deficiencies have been reported. The output of nurses in South Africa will in this way be increased and improved. The syllabus and courses of training for midwives was revised and the period of training lengthened from twelve to eighteen months. These changes will come into force on the 1st January, 1941, and should result in the better training of midwives.

In terms of Act No. 13 of 1928, the period of office of the Council expired and a new Council was constituted on the 1st January, 1939, consisting of the following members:—

Elected by Medical Practitioners:

C. J. Albertyn—Pietermaritzburg.
 F. P. Bester—Paarl.
 S. Copley—Durban.
 S. M. de Kock—Bloemfontein.
 H. A. Moffat—Hermanus.
 G. E. Nesbitt—East London.
 J. Pratt-Johnson—Johannesburg.
 A. W. Sanders—Pretoria.
 F. Spencer Lister—Johannesburg.
 H. F. B. Walker—Balfour.

Appointed by Government:

K. Bremer—Capetown.
 E. H. Cluver—Pretoria.
 E. W. Douglass—Waku Station, Eastern Province.
 W. H. Rood—Pretoria.
 W. Russell—Pretoria.
 J. A. Stegmann—Bloemfontein.
 E. N. Thornton—Pretoria.
 B. Vivier—Windhoek.

Elected by Dentists :

R. V. Bird—Pretoria.
M. Braun—Capetown.
C. J. Bullis—Durban.

Elected by Nurses and Midwives :

B. G. Alexander—Johannesburg.
C. A. Nothard—Durban.

Appointed by Universities of Capetown and Witwatersrand :

E. Barnard Fuller—Capetown.
R. A. Dart—Johannesburg.

At the first meeting of the newly constituted Council, Dr. S. M. de Kock was elected President, Sir Edward Thornton, Vice-President, and Dr. A. W. Sanders was appointed Treasurer to the Council.

The Registrar of the Council, Mr. Ewald Herbert, who had held office since the constitution of the Council in 1928, and for a considerable number of years previously with the Transvaal Medical Council, retired on the 1st December, 1938. Mr. William Impey was appointed to act as Registrar until a permanent appointment was made.

39.—THE SOUTH AFRICAN PHARMACY BOARD.

Résumé of Business for the Year ended 30th June, 1939.

The usual half-yearly meetings of the Board were held in July, 1938, and January, 1939, and, in addition, three special meetings were held besides several meetings of the standing committees. The Board meetings lasted two days in each case, and a large volume of business was transacted at each meeting.

During the period under review, the registration of 52 chemists and druggists, 41 managing directors of companies, carrying on the business of chemists and druggists, and of 65 apprentices was effected. Of the chemists and druggists registered, 43 hold the Qualifying Certificate of the Board, and 9 the Certificate of the Pharmaceutical Society of Great Britain, their registration being effected by virtue of the reciprocity agreement entered into with that body.

On the 30th June, 1939, the names of 1,462 chemists and druggists, 138 managing directors and 185 apprentices appeared in the Board's registers. Examinations were held in December, 1938, and June, 1939. The following tables show the results:—

TABLE 62.—SOUTH AFRICAN PHARMACY BOARD: PRELIMINARY SCIENTIFIC EXAMINATION.

	Number of Candidates Examined.	Passed.	Failed.	Referred.		
				Botany.	Chemistry.	Physics.
Whole Exam.....	101	30	43	5	17	6
Botany.....	7	6	—	1	—	—
Chemistry.....	23	13	—	—	10	—
Physics.....	12	11	—	—	—	1
	143	60	43	6	27	7

TABLE 63.—SOUTH AFRICAN PHARMACY BOARD: QUALIFYING EXAMINATION.

	Number of Candidates. Examined.	Passed.	Failed.	Referred.	
				Chemistry.	Dispensing.
Whole Exam.....	72	18	22	11	21
Chemistry only.....	27	7	—	20	—
Dispensing only.....	30	16	—	—	14
	129	41	22	31	35

NOTE.—Candidates for examination in only one subject were previously referred for further study in that subject. By passing in that subject, they are accepted as having passed the whole examination.

The Board agreed to add the University of Capetown and the University of Pretoria to the list of institutions at which courses of training and study for the Preliminary Scientific Examination may be taken, and the Government Notices giving effect thereto were published in March and June, 1939.

The Board also gave a great deal of consideration to the rules relating to the registration of chemists' apprentices, and amendments to the regulations have been submitted to all the pharmaceutical societies in the Union for their comments, before steps are taken to formally adopt these proposed amendments.

It was also resolved to add the qualification M.Sc (Pharm.) of the University of Manchester to the list of qualifications which may be registered as additional qualifications by persons whose names appear in the Pharmacy Register.

Owing to complaints having been received that chemists and druggists were associating themselves with persons who were not registered and who professed to diagnose and treat disease, the Board has made it an ethical offence for a registered chemist and druggist to so associate himself.

Consideration was given to suggestions that various drugs be placed in the Fourth Schedule of Act No. 13 of 1928, and Benzedrine and its salts were added to Division I of the Schedule. The Board's recommendation in regard to other drugs has been sent to the Minister for Public Health, and is still receiving consideration.

Various complaints against registered chemists and druggists were received, and in three cases of alleged abuse of the apprenticeship regulations, the Board decided to hold enquiries, but on taking legal opinion in regard thereto, decided to abandon the formal enquiries and dealt with each case on its merits. In two other cases, formal enquiries were held, in one of which the chemist was found guilty of advertising his dispensing services, and he was cautioned by the Board. In another case, the chemist who had been convicted by the magistrate of failing to keep his habit-forming drug register as required by the Act, was found guilty of improper conduct, and was sentenced to a reprimand and a caution. Several other complaints of unprofessional conduct received the consideration of the Board, and it was decided to hold formal enquiries in connection with five of them. The enquiries had not actually been held during the period under review.

The Board had the Medical, Dental and Pharmacy Act, with all the rules of the Board promulgated thereunder, published in handbook form and copies are available to persons requiring them. Thus far, a fair number has been issued, and the publication of this book appears to have been justified.

In terms of Act No. 13 of 1928, the period of office of the Board expired, and a new Board was constituted on the 1st January, 1939, consisting of the following members:—

Elected by Chemists and Druggists:

- D. S. B. Anderson, Durban.
- G. B. Christie, Johannesburg.
- M. W. Clancy, Capetown.
- A. M. Fyvie, Pietermaritzburg.
- R. MacIntosh, Johannesburg.
- A. M. Reichenberg, Bloemfontein.
- F. J. Todd, Port Elizabeth.

Appointed by the Government:

- J. Christie, Johannesburg.
- E. C. Davies, Durban.
- Dr. P. Allan, Capetown.

At the first meeting of the Board, held in 1939, Mr. J. Christie was elected president and Mr. A. M. Fyvie vice-president. Mr. MacIntosh was appointed treasurer of the Board.

The Registrar of the Board, Mr. Ewald Herbert, who had held office since the constitution of the Board in 1928, and for a considerable number of years previously with the Transvaal Pharmacy Board, retired on the 1st December, 1938, and Mr. W. Impey was appointed to act as Registrar until a permanent appointment is made.

40.—ADMINISTRATION OF THE MEDICAL, DENTAL AND PHARMACY ACT, No. 13 OF 1928.

Habit-forming Drugs.—The Department continues to administer the Act relating to dagga, opium and other habit-forming drugs. The regulations are enforced with the assistance and co-operation of the Police, the Commissioner of Customs and Excise and the Postmaster-General.

The following table indicates the number of prosecutions and convictions:—

TABLE 64.—PROSECUTIONS AND CONVICTIONS UNDER LAWS RELATING TO HABIT-FORMING DRUGS DURING THE YEAR ENDED 30TH JUNE, 1939.

Province.	European.		Native.		Asiatic.		Other Coloured.		Total.	
	Pro-secu-tions.	Con-vic-tions.	Pro-secu-tions.	Con-vic-tions.	Pro-secu-tions.	Con-vic-tions.	Pro-secu-tions.	Con-vic-tions.	Pro-secu-tions.	Con-vic-tions.
Cape.....	43	36	498	450	7	7	1,196	1,158	1,744	1,651
Natal.....	15	13	2,338	2,277	72	68	87	82	2,512	2,440
Transvaal.....	74	68	3,337	3,201	8	6	299	288	3,718	3,563
O.F.S.....	8	6	338	322	—	—	23	23	369	351
UNION....	140	123	6,511	6,250	87	81	1,605	1,551	8,343	8,005

The total number of prosecutions in the Union amounted to 8,343, being in respect of dagga. Considerable quantities of dagga were seized and destroyed.

The quantities of habit-forming drugs imported into the Union during the year ended 30th June, 1939, were:—

Raw opium, 645 lb. 4,813 gr.; medicinal opium, 215 lb. 2,798 gr.; opium in the form of extracts and tinctures, etc., 70 lb.; coca leaves, 41 lb.; Indian Hemp in the form of galenical preparations, 141 lb. 2,408 gr.; morphine 67 lb. 3,067 gr.; diacetylmorphine, 16½ lb. and cocaine 39 lb. 3,732 gr.

The following habit-forming drugs were exported from the Union to the adjoining territories during the period under review:—

Medicinal opium, 1 lb.; opium in the form of tinctures, etc., 46 lb. 1,882 gr.; Indian Hemp in the form of galenical preparations, 700 gr.; morphine, 1 lb. 288 gr.; diacetylmorphine 3,014 gr. and cocaine 2 lb. 6,443 gr.

The permit authorising the cultivation of dagga for export purposes has been withdrawn, as it was ascertained that the stocks of the drug on hand at the present time are adequate to meet the demand.

The registers of habit-forming drugs, in the form laid down in the regulations which must be maintained by all persons legally using habit-forming drugs in accordance with the provisions of chapter VI of the Medical, Dental and Pharmacy Act, No. 13 of 1928, have been systematically examined by inspectors of the Department. Orders and prescriptions have been checked as also the stocks of drugs on hand in order to ascertain whether any discrepancies have occurred. Any omissions or irregularities discovered have in the main been susceptible of adjustment by correspondence, but in certain flagrant cases of contraventions of the provisions of the Act, after due warning had been given, resort was had to prosecution.

The Union Government as a party to the International Opium Conventions and the Limitation Convention of 1931 for limiting the manufacture of narcotic drugs to the world's legitimate requirements for medical and scientific needs and by regulating their distribution, is required to furnish quarterly and annually, statistics of all narcotic drugs used. For this purpose a system of import and export permits is in force. This import and export certificate system appears to be working satisfactorily and no difficulties have arisen in regard to the Government's obligations under the International Conventions.

Act No. 13 of 1928 lays down that habit-forming drugs may be prescribed or used by medical practitioners for definite curative or therapeutic purposes, but not to satisfy a craving or for the relief of a habit. A habit-forming drug may, however, be administered or used for the treatment of addiction in a hospital or institution maintained wholly or partly by the Government or a provincial administration or approved for the purpose by the Minister of Public Health.

Certain cases have necessitated treatment for drug addiction in nursing homes. On application by the medical practitioner concerned permits were granted by the Minister approving of the institutions for such treatment.

The position in regard to the use of abnormal quantities of habit-forming drugs by medical practitioners in the course of their practice, as revealed by careful investigation of the registers of such drugs, has been kept under observation and, with very few exceptions, it has been sufficient to bring the matter to the notice of the medical practitioner concerned to have the matter rectified.

Poisons.—The amendments to sections 50 and 51 (i) of Act No. 13 of 1928 and the regulations regarding the sale and labelling of poisons and preparations containing poison, have facilitated the administrative difficulties which arose in connection therewith. Inspections of general dealers' premises still reveal infringements of the provisions of the Act, both as regards incorrect labelling and failure to keep records of sales of poisons in the "poisons book". Written warnings have usually been sufficient to rectify the matter, but repeated omissions have been dealt with by the police who instituted legal proceedings against the persons concerned.

The increasing number of drugs of a dangerous and poisonous nature which do not fall to be classed as poisons within the meaning of Act No. 13 of 1928, and which may be sold by any person in possession of a patent medicine licence, has been brought to the notice of the Department. Steps are being taken whereby certain of these drugs will be included in either Division I or Division II of the Fourth Schedule or classed as "poisonous substances" under section 82 of the Act.

Moreover, as a result of representations made, the Department has under consideration the question of the addition of a further schedule to the Medical, Dental and Pharmacy Act, including chemotherapeutic and organotherapeutic substances and other agents of a similar nature, whose sale by unqualified persons entails considerable risk to public health, and to ensure that such articles shall be available to the public only through persons with a knowledge of the properties and dangers of the substance.

General.—The inspection of the "poison registers" which must be maintained by chemists and druggists and general dealers who are authorised to sell poisons by virtue of a certificate issued under section 51 of Act No. 13 of 1928, is carried out by the Department's inspectors in conjunction with their duties under the Food, Drugs and Disinfectants Act No. 13 of 1929. At the same time any infringements in regard to habit-forming drug stocks and regulations pertaining thereto, which must be observed by chemists and druggists, are reported to this Department. The salutary effect of judicious prosecution has done much towards the decrease in the number of contraventions of the Act, and in general the position appears to have improved.

41.—DENTAL HEALTH SERVICES.

An important new work commenced by the Department during the year has followed the appointment of a Dental Health Officer, Dr. T. Ockerse. The co-ordination of dental work being visualised as one of the duties of this officer, a report on existing dental services was first required. This survey was made and the main features of the report are given here.

There are few properly organised preventive and conservative public dental health services in operation in South Africa. Simple extraction services represent the most that is done in the majority of schemes. Virtually no public dental health education is going on, and dental health research is also to all intents and purposes non-existent. In the Transvaal there are schemes operating in Johannesburg, Pretoria, Springs and Germiston. The Dental School of the University of the Witwatersrand and the Johannesburg School Dental Clinic undertake most of the dental work for necessitous patients for Johannesburg other than hospital cases. In Pretoria the Dental Clinic provides treatment for indigent and semi-indigent persons. In both these areas full-time dental officers attend at the clinics; in the case of the Springs and Germiston clinics, part-time dentists provide the services. Dental treatment of indigent adults in the rural areas of the Transvaal is mostly provided in an honorary capacity by the local dentists in their surgeries or in the local provincial hospitals or similar institutions. Treatment for indigent school children is provided under the Transvaal Provincial Dental Scheme, controlled by the Education Department and administered by the Transvaal Dental Association. Dentists have been appointed in various areas on a part-time basis to do the work.

In the Free State there are no official dental health schemes. Honorary dental surgeons attend to patients requiring treatment in the National Hospital, Bloemfontein. In other areas all indigent adults are treated by dentists in an honorary capacity in their own surgeries, or in local provincial hospitals and similar institutions. The dental treatment of indigent school children in the Orange Free State is conducted on similar lines to that in the Transvaal. A Municipal Dental Clinic has been in existence in Bloemfontein since 1931.

In Natal dental services for indigent school children and adults are provided in the Addington Hospital, the King Edward VIII Hospital, Durban, and the Grey's Hospital, Maritzburg. In the other areas of the Natal Province indigent adults receive treatment following investigation by the magistrate. Dental treatment for indigent school children is provided in several towns by arrangements made by the Dental Association.

Clinics have been established for indigent adults and children in Cape-town, Port Elizabeth and Kimberley, while in East London indigent adults receive attention at the Lady Frere Hospital. Dental treatment for indigent adults in the other rural and urban areas of the Cape is mostly provided by the local dentists in an honorary capacity in their surgeries, and in the local provincial hospitals. Dental treatment for indigent school children in towns other than those mentioned above, and in rural areas, is provided by the Cape Provincial Administration.

In addition to the various provincial arrangements, dental treatment is provided for various groups by the Union Education Department, the Department of Social Welfare, and the Department of the Interior.

The need for more comprehensive dental services is fully confirmed by the results of the preliminary surveys already undertaken. In the Kruisrivier area near Knysna, 75 children in the local schools when examined revealed 14 cavity surfaces per child and an incidence of dental caries of 100 per cent. In the Beaufort West district, where conditions are much more satisfactory, the school children yet showed an incidence of nearly 50 per cent. of dental caries. Other surveys in the Langkloof, Knysna, and certain areas of George and Mossel Bay, have confirmed previous findings that in these districts the incidence of dental caries is appallingly high. Many rural communities in this region are so badly affected that practically all adults are edentulous.

On his return from America, where he has been studying dental health research and organisation, the Dental Health Officer is to continue his survey of dental conditions in the Union. Thereafter the Department wishes to proceed as expeditiously as possible to develop and co-ordinate the various measures to deal with the undoubtedly serious dental problems in this country.

42.—HERBALISTS.

In recent years the practice of herbalists in the Union has increased to such an extent as to form a definite menace to public health. Few herbalists are capable of recognising infectious disease and as a consequence, persons, especially Natives, suffering from highly infectious disease, may be treated by herbalists and whilst undergoing such treatment may spread disease to all persons with whom they come into contact. As a result the spread of infection is facilitated and the existence of the disease is not notified to the responsible authorities. The Department possesses several records of cases where Natives suffering from infectious disease including venereal disease have been treated by herbalists who have not diagnosed the disease and who have attempted to treat the patients without avail by means of worthless nostrums.

The use of indigenous herbs has been encouraged in the past by Native witch-doctors many of whom with the advent of civilisation became Native herbalists. Under the Natal Law of 1919 they were permitted to practise as "medicine men" amongst Natives in Zululand; but since the promulgation of the Medical, Dental and Pharmacy Act of 1928, no new Native herbalist licences have been issued except under very special circumstances. In recent years the European herbalist has to some extent assumed the practice of these Native herbalists amongst the Native peoples, in addition to fostering the sale of his remedies amongst Europeans.

Many complaints have been received by this Department concerning the activities of these European herbalists, particularly amongst the Native peoples. Sections 34 and 37 of the Medical, Dental and Pharmacy Act, No. 13 of 1928, were drafted with the intention of protecting the public against persons purporting to be medical practitioners or pharmacists, who are not in possession of the statutory qualifications.

In terms of the sections referred to, any person who is not registered as a medical practitioner or a chemist and druggist, who for gain, performs, *inter alia*, any act specially pertaining to the calling of a medical practitioner or chemist and druggist, shall be guilty of an offence. The acts which could only be performed by members of the two professions, were not clearly defined in the original Act and herbalists who were allowed only to sell herbs by virtue of a general dealer's licence became aware of this loophole in the law and commenced diagnosing and treating patients for various diseases, thereby contravening the intention though not the letter of the law.

Accordingly Act No. 5 of 1937 was passed to define the acts specially pertaining to the calling of a chemist and druggist. This amendment, which defined the compounding of herbs and drugs as an act specially pertaining to the calling of a chemist and druggist, partially closed the loophole, and as a result Turner and de Marillac were found guilty of contravention of the Medical, Dental and Pharmacy Act, No. 13 of 1928, as amended by Act No. 5 of 1937. (640 of October, 1937.)

As a consequence of the passing of Act No. 5 of 1937, and the conviction of Turner and de Marillac mentioned above, it became obvious to herbalists that they could not continue to practice as such unless they employed a registered chemist and druggist to compound their herbal remedies. This loophole was closed by the promulgation of rules of conduct by the Pharmacy Board forbidding chemists and druggists from associating with unregistered persons who diagnose or profess to be able to treat disease.

This brief summary of the legal position of herbalists in the Union to-day may explain to some extent why these practitioners are now seeking some form of recognition.

During the past session of Parliament, C. W. G. M. de Marillac, a herbalist of Benoni, petitioned the House of Assembly to amend the Medical, Dental and Pharmacy Act, No. 13 of 1928, so as to enable, subject to adequate and proper safeguards for the protection of the public, persons who may be able to prove that they possess special skill in and knowledge of the treatment of human disease by medicinal herbs, to be registered as practitioners.

A Select Committee of the House of Assembly was appointed to consider this petition. The Committee heard the evidence of twenty witnesses including de Marillac, a dealer in herbs, who represented himself as one of de Marillac's agents, and five witnesses who appeared to testify on his behalf.

Under cross-examination de Marillac displayed an amazing lack of knowledge of even the most elementary principles of anatomy, *materia medica* or chemistry. Although he claimed that he was able to diagnose disease by looking into his patient's eye and seeing in the eye a picture of the diseased organs, he was not able to tell the Committee the number of lobes in the right or left human lungs or the chemical formula for common salt.

The Select Committee came to the conclusion that de Marillac was either self-deluded or consciously fraudulent in his claim to be able to diagnose and heal disease. There are many vendors of herbs and herbal remedies in the Union, however, to whom no benefit of the doubt can be given and who must be considered to be consciously fraudulent. Such persons prey on the ignorant sick and sell simple decoctions with the claim that they will cure the most serious ailments.

The evidence of Mr. Gilson given before the same Select Committee illustrates the activities of certain vendors of herbal remedies. According to this witness, two men operating together would rent a store where there was a congregation of Natives, or go to a centre where the district surgeon was in the habit of visiting. One of the men would remain in a car whilst the other would go out and diagnose the ailment from which the Natives were suffering. He would then refer the Native to the man in the car who would give him a bottle of medicine labelled either No. 1 or No. 2. This Department has on several occasions received complaints regarding persons selling medicines and diagnosing disease in this manner, but owing to the loopholes in the law it has been unable so far to take any action.

There appears to be an impression current in the minds of certain persons including persons of some education, that herbalists in the Union are in possession of certain remedies, obtained from indigenous plants, which are specific in their action in curing dangerous diseases such as tuberculosis, cancer and syphilis. Whilst the presence of such herbs in the Union is not impossible, it must to-day be admitted that the chances that such herbs exist are extremely remote.

During the past fifty years a comprehensive examination of the pharmacological properties of South African plants has been carried out by scientists who have given their lives to this study. These men have examined many thousands of plants found in the Union and although in many cases they have found these plants to possess medicinal properties, these medicinal properties were the same as those possessed by plants grown in other countries from which the active principles have been separated in a pure state. In many cases the plant cultivated overseas has been developed to produce larger quantities of the active material than can be obtained from the wild plant grown in the Union.

It is seldom realised that plants can be separated into orders, the plants of which may contain chemically related drugs which possess similar pharmacological actions and which can be used in treating the same kind of disease. Thus many plants of the order *Apocynaceae* contain drugs which have a characteristic action on the heart and can be and are used in the treatment of heart disease. Members of this order exist in South Africa and from them potent glycosides can be separated. The same or similar glycosides have, however, been obtained from plants of the same order found overseas and in practically every plant examined it has been found that the South African plant is inferior in its active principle content when compared with the same plant cultivated in other lands.

A claim is frequently made by herbalists that the herbs which they use cannot be identified once they have been reduced to powder form. The examination of such powdered plants is the task of the skilled pharmacognostic expert. Such experts are capable of identifying plants from minute fragments and in many cases even though the species of plant cannot be identified the order can be defined. Little pharmacognostic identification of South African indigenous plants has yet been carried out and it would appear that in view of the claims made by herbalists this is a rich field for further investigation.

It must be admitted that medical science is not successful in treating every case of disease which presents itself for treatment. On the other hand, cases of serious disease occur, which may, whilst undergoing treatment, suddenly and for some unknown reason become cured, although the cure is not in any way due to the treatment to which the patient was being subjected. Cases of diabetes and even of cancer have been known to become cured in this way. Such cases provide a rich material for advertising by herbalists and other unqualified practitioners into whose hands they fall. The public is generally unaware that such cases may occur in the hands of medical men whose ethical code forbids any of the forms of advertising which are at present allowed to unqualified practitioners of the healing art.

Another type of case which provides a rich field for the herbalist is the neurotic individual who so frequently suffers from what is termed by medical men "functional disease". Functional disease includes complaints which the patient refers to his body. In reality these complaints arise mainly or entirely in his mind or emotions. A good example of functional disease is the condition of club-foot. Before modern diagnostic aids such as anaesthetics and X-rays were available, cases of club-foot presented themselves, which were found at operation to be perfectly normal, the contractions being entirely due to the effect of the patient's mind on the muscles controlling the shape and attitude of the foot. To-day such cases would be readily diagnosed as soon as the patient was anaesthetised or X-rayed.

Cases of functional disease present a rich field for herbalists and other unqualified practitioners. Such patients pass from one doctor to another and from the medical profession to unqualified practitioners. After each consultation if the practitioner possesses some personality the patient shows improvement, only to relapse later and seek the help of a new prophet. Such patients are extremely suggestible and make excellent witnesses in support of the claims of the latest practitioner who has treated them.

Other cases which are used to advance the claims of the unqualified practitioner are cases such as duodenal ulcer in which even after the most skilful treatment, relapses may occur after periods varying from months to years. Such cases treated by herbalists may recover from the attack and later relapse. Whilst free from pain, the patient acts as a valuable advertisement for the unqualified practitioner.

Still another group of diseases which provides a ready field for exploitation by herbalists and other unqualified practitioners is the group of diseases known as allergic diseases. Such conditions as asthma, hay fever and certain migraine headaches are classed together in this group. One of the outstanding characteristics of these diseases is that the symptoms frequently disappear at one of the physiological thresholds of life, e.g. at puberty or at the menopause. Frequently asthmatic children who have received attention from one medical practitioner after another without avail, are at last taken to the herbalist who achieves a miraculous cure. This cure, however, is only too frequently due to the fact that the young patient visited the herbalist about the age of puberty, when his symptoms would have disappeared without any treatment whatsoever.

Whilst the number of European herbalists in the Union has increased in recent years the number of non-European herbalists has also increased. Thus in a recent survey of the activities of Natives in Johannesburg it was found that out of 1,418 Native-owned businesses, 133 were herbalists, some of whom earned £40 a month and included Europeans amongst their clientele. The Assistant Chief Magistrate of the Transkei in giving evidence before the Select Committee of the House of Assembly on de Marillac's petition, stated that a herbalist's agent would sell £70 worth of herbs in one morning to Natives on a rural trading station. In many cases the Natives spend money on herbs which would be better spent on foodstuffs the lack of which had contributed to their defective state of health.

It is clear from the evidence given by several witnesses before the de Marillac Select Committee that, as stated in the Committee's report, there is commercial exploitation on a very large and highly remunerative scale, of bottles of medicine and packets of herbs sold wholesale for distribution by agents in the Native Territories and elsewhere.

The Select Committee recommended that the loopholes afforded by the present state of the law, to unqualified practitioners, be stopped by more effective legislative provisions, with the least possible delay, and that the sale of so-called herbal remedies should also be controlled by legislation.

There is undoubtedly an urgent need for additional legislation which will serve to control the activities of herbalists as well as of other unqualified practitioners. Such legislation must of necessity require the registration of all secret remedies and would therefore also serve to control the large number of useless or dangerous proprietary medicines which are at present being sold in the Union without restriction.

XI.—OTHER MATTERS.

43.—ADULTERATION OR FALSE DESCRIPTION OF FOOD, DRUGS AND OTHER ARTICLES.

Table 65 reflects the administrative measures taken during the year under the Food, Drugs and Disinfectants Act, No. 13 of 1929:—

TABLE 65.—SAMPLES TAKEN FOR EXAMINATION OR ANALYSIS UNDER ACT NO. 13 OF 1929, DURING THE YEAR ENDED 30TH JUNE, 1939, AND THE RESULTS.

Place.	Total Taken.	No. Analysed or Examined.	No. found Adulterated or Incorrectly or Falsely Described.	Prosecutions.	Convictions.	Remarks.
Ports of Union.....	267	248	3	—	—	Warnings <i>re</i> labelling and standards were issued in respect of 45 samples; 89 were detained pending re-labelling; no samples were destroyed.
Cape Province.....	2,134	2,070	229	155	148	—
Natal Province.....	609	607	55	43	42	—
Transvaal Province..	2,788	2,782	362	277	224	—
Orange Free State Province.....	356	353	35	31	26	—
TOTAL.....	6,154	6,060	684	506	440	

A comparison of the foregoing figures with those for the 12 months ended 30th June, 1938, discloses that 255 more samples were taken during the year under review than during the firstmentioned period, while 468 less samples were found on analysis to be adulterated or falsely described, 352 less prosecutions instituted in respect of adulteration or false description and 292 less convictions obtained.

Imported Articles dealt with at Union Ports (including Inland Customs Ports of Entry).

The work in this connection is still being carried out with the co-operation and assistance of the Department of Customs and Excise and of the 267 samples submitted for analysis or examination 71 came from Capetown, 55 from Johannesburg, 75 from Durban, 43 from Port Elizabeth, 14 from East London, 4 from Pretoria, 1 from Knysna and 4 from Lourenco Marques. Of these, 3 were found to be not up to standard, 45 warnings were issued on account of defective labelling or deficiency in standard, 89 consignments were released after relabelling in Customs. No samples were destroyed or reshipped. The articles examined included cheese (99 samples), ghee (7 samples), disinfectants (19 samples), drugs (3 samples), fish and meats (26 samples), milk powder (15 samples), fresh canned peas (4 samples), flour (1 sample), jams (7 samples), condensed milk (8 samples), cream (5 samples), custard powder (3 samples), fats (29 samples), leavening substances (3 samples), chutneys and sauces (2 samples), coffee and mixed coffee (3 samples), cordials and squashes (2 samples), jelly powders (3 samples), malt extract (5 samples), soap (6 samples) and bread, caviar, soup and flavouring substances (1 sample each).

In regard to imported foodstuffs, drugs and disinfectants, it is pleasing to note that out of a total of 267 samples submitted by the Customs authorities, only 3 were found to be adulterated or not up to standard. This can be ascribed to:—

(a) The Department's vigilance in the past combined with its policy of firm and impartial enforcement of the provisions of the Act and Regulations while at the same time furnishing importers and oversea suppliers with necessary advice regarding the requirements;

(b) co-operation of importers; and

(c) the undoubted fact that producers and exporters overseas are becoming more conversant with the South African requirements.

In this connection it may be mentioned that, judging by the increasing number of enquiries received by the Department, manufacturers and intending exporters from overseas are making special efforts to ensure that their products comply fully with the requirements prior to exportation to this country.

There is still room for much improvement as regards compliance with the labelling provisions of the Act and Regulations. Although in the majority of cases infringements are of a purely technical nature, it is felt that the time has come when more attention should be paid to labelling in particular.

As with imported articles, it was found that there has been a decided improvement in regard to compliance by local manufacturers with the required standards, although infringements of the labelling provisions of the Act and Regulations were brought to notice on frequent occasions. In the Cape Peninsula particularly an intensive systematic inspection of all manufacturers' premises was carried out during the year, specimen labels for all lines taken and, where necessary, verbal and written advice given or warnings issued in respect of the smallest infringement discovered. It has been found that on the whole manufacturers and others concerned appreciate the advice and assistance given them and have responded immediately by having new stocks of labels printed.

The majority of manufacturers and sellers of articles such as ointments, creams, powders and similar substances for application to or use for the human skin or hair, still appear to be unaware of the fact that these preparations are subject to the labelling and certain other provisions of the Act and Regulations. The Department again wishes to invite the attention of manufacturers to Government Notice No. 574 of the 28th March, 1930, in which the provisions of sections 2 to 7 inclusive, 9 to 12 inclusive, 20 to 35 inclusive, and 37 to 44 inclusive, are applied to any ointment, cream, powder or similar substance for application to or use for the human skin or hair, soap, tobacco, cigars, cigarettes, snuff, chewing gum and surgical dressings.

Sampling by Local Authorities.

Two fresh delegations in terms of section 2 (3) of the Act were made during the year, namely to the Bethlehem and Witbank Town Councils. The number of municipalities authorised to undertake the sampling in their areas of perishable articles as also flour, meal, bread and other articles not packed or sold in sealed packages is now 32. They are:—Capetown, East London, Graaff-Reinet, Grahamstown, Kimberley, Kingwilliamstown, Paarl, Port Elizabeth, Queenstown, Uitenhage, Walmer (Cape Province); Benoni, Boksburg, Brakpan, Germiston, Hercules, Johannesburg, Klerksdorp, Krugersdorp, Nigel, Potchefstroom, Pretoria, Randfontein, Roodepoort-Maraiburg, Springs, Vereeniging and Witbank (Transvaal); Bethlehem, Bloemfontein and Kroonstad (Orange Free State); and Durban and Pietermaritzburg (Natal).

These local authorities are entitled to the examination or analysis in a Government laboratory free of charge, of an annual number of samples calculated on the basis of 4 samples per 1,000 of their European population. During the year a total of 3,848 samples was taken by them under their delegated powers (namely 977 in the Cape Province, 2,386 in the Transvaal, 366 in Natal and 119 in the Orange Free State), of which 487 were found to be adulterated. Legal proceedings were instituted in 382 cases. Convictions were obtained in 326 of these cases and fines totalling £1,185. 14s. were imposed. The more important articles submitted for analysis included 2,729 samples of milk (322 adulterated), 363 meat and fish (70 adulterated), 139 sausages (16 adulterated), 207 ice-cream (32 adulterated), 83 coffee and chicory (4 adulterated), 31 flour and meal (none adulterated), 43 fats and oils (7 adulterated), 20 cheese (4 adulterated), 25 honey (4 adulterated), 12 dried fruit (5 adulterated), 12 sugar (none adulterated), 37 butter (11 adulterated), 6 rice (none adulterated), 1 oats (not adulterated), 9 tea (3 adulterated), and 5 aerated waters and squashes (2 adulterated).

Sampling by the Department.

The Department's inspectors, two of whom are stationed in Capetown, one in Pretoria and one in Durban, are entrusted with the duty of carrying out sampling in the areas allotted to them for inspection purposes under the Act. In smaller urban areas sampling, especially of milk, takes place with the co-operation and assistance of the South African Police. In Johannesburg, the City Council's inspectors carry out, on behalf of the Department, the sampling of milk on Railway premises and of such articles as are not covered by the powers delegated to the Council in terms of section 2 (3) of the Act. A total of 2,039 samples was submitted for analysis, of

which 194 were adulterated. A hundred and twenty-four prosecutions were instituted and 114 convictions recorded, in respect of which fines totalling £264. 10s. were imposed. Some of the articles analysed included milk 1,446 samples (104 adulterated); drugs and medicines 171 (37 adulterated); meat and fish 57 (11 adulterated); fresh fruit 16 (1 adulterated); aerated waters and squashes 26 (none adulterated); coffee 14 (4 adulterated); ice-cream 46 (11 adulterated); dried fruits 15 (4 adulterated); fats and oils 59 (8 adulterated); chutneys and sauces 17 (2 adulterated); soap 23 (1 below standard); disinfectants 4 (2 adulterated); pepper 3 (none adulterated); cheese 1 (not adulterated); leavening substances 7 (1 adulterated); canned vegetables 14 (none adulterated); honey 13 (none adulterated); jams 4 (none adulterated); peanut butter 1 (not adulterated); flour 7 (none adulterated); cream 1 (not adulterated); ginger beer 30 (8 adulterated).

Close attention was devoted during the year to the sampling of drugs. Acting on information received that a number of locally manufactured brands did not comply with the standard laid down in No. 31 of the Regulations framed under the Act, a total of 184 samples was purchased of which 37 were found to be adulterated. Proceedings in one case, viz. Quinine Hydrochloride grs. V., resulted in a conviction being secured and a penalty of £35 imposed.

General.

The Department's inspectors continue to carry out inspection tours of the Union in connection with the enforcement of the provisions of Act No. 13 of 1929. These still reveal irregularities which necessitate written warnings being sent to the offenders. On the whole, however, a decided improvement is noticeable on the part of manufacturers and others in complying with the labelling requirements of the Act.

Unsound Foodstuffs.

The inspection and examination of consignments of foodstuffs entering the country continued as far as was practicable with the collaboration of the Department of Customs and Excise. Those condemned as unfit for human consumption included 16 cases canned fish, salmon and sardines; 13 cases tea; 3 bags rice; 3 cases dates; 6 cases cocoa; 20 cases hams and meat; 1 parcel smoked snoek; 1 part case cherries; 75 cases almonds; 44 cases sausages; 20 cases vegetables; 9½ cases olives; 20 bags chicory; 2 cases chewing gum; 14 tins jam; 3 casks fish; 1 case peas; 1 case chillies; 1 bag flour; 1 bag ground nuts and 1 cask onions.

The total approximate value of foods destroyed in terms of the Port Health Regulations as unfit amounted to £655.

Inspectors of the Department in the course of their inspection tours under Acts No. 13 of 1928 and No. 13 of 1929 also dealt with tinned foodstuffs stocked by general dealers and such as were found to be blown or otherwise not sound were suitably disposed of.

In places where there is a constituted local authority, action under the Unsound Foodstuffs Regulations devolves on such authority.

44.—DIETETICS.

Dietetics may be regarded as that aspect of nutrition which deals with the application of the principles of nutrition in feeding individuals or groups of individuals. As long ago as 1830, dietetics was recognised as "a branch of medicine". To-day, it is still regarded as such, because medical men, perhaps more than any others, have consistently stressed the importance of food in its relation to health and the prevention and treatment of disease.

Although its beginnings as a science may be traced to the time of Lavoisier, nearly two centuries ago, the actual advance of nutrition has been slow. It is only within the last forty years that our knowledge has grown extensively. Among the important developments of this later period have been the qualitative and quantitative studies of foodstuffs and their value in the diet in meeting the physical requirements for energy, growth and repair, regulation of body processes and protection from disease. The rôle of the mineral constituents of foods and their relation to growth and certain deficiency diseases is known and continues to provide a wide field of research. The discovery of the vitamins has taken place in recent years. Their importance to growth, reproduction, the maintenance of health and the prevention of deficiency diseases has been proved. In the field of diet therapy, the discovery of insulin in 1921 led to a complete revision of the treatment of diabetes with consequent beneficial results to the health of those suffering from this disease. In malnutrition, in the deficiency diseases, in diseases of the digestive organs, the kidney and urinary tract, in fevers and in post-operative cases, the diet is considered to be of primary importance.

In South Africa, recent surveys of the health of school children have revealed the fact that the problem of malnutrition is a grave one. In our hospitals, school hostels, orphanages, and other institutions, conditions leave much to be desired. Some of the important factors affecting the nutrition of the inmates have been observed during visits to these institutions in various parts of the Union. There appears to be a lack of properly planned dietaries, providing for the optimal nutritional requirements during growth, illness or convalescence. In many cases, inferior quality foodstuffs are used and nutritive values are often sacrificed to price. Such practices are, in the end, poor economy. Unscientific methods of food preparation are common to all institutions and result in impaired flavour, texture and appearance with accompanying loss of food values. Monotony of menus and inefficiency of food service aggravate the situation, while unhygienic conditions in the kitchens, storage rooms, etc., and badly planned kitchens, poor equipment and inefficient workers all contribute to lower nutritional standards.

The need for revision of existing nutritional standards in State and State-aided institutions, as well as those of the general public, has been a matter of concern to the Department of Public Health for some time past. The Department, however, has been aware of the fact that, in the light of modern nutritional research, dietetics has become an exact science, which can no longer be administered in its complicated phases by other than an expert. For this reason, it was decided to appoint three trained and experienced dietitians, who would give help and guidance, where needed, in all matters pertaining to better methods of food administration and more accurate work in diet therapy as well as in general nutrition.

On October 1st, 1938, a senior dietitian was appointed and a month later an assistant dietitian joined the Department. So far it has not been possible to fill the post of second assistant dietitian, owing to the lack of fully qualified and experienced candidates. This shortage is no doubt due to the fact that there is no training for dietitians in South Africa and those who have qualified fully have had to go overseas or have come from abroad.

It is to be hoped that opportunities for the fullest training possible in the field of dietetics in this country will be created, but this will mean careful planning and co-operation on the part of our universities and large general hospitals. As long as food administration is left in the hands of untrained or only partly trained people, poor nutritional standards must prevail, waste and other sources of leakage will go on increasing food costs, while discontent and dissatisfaction continue to aggravate the position.

The dietitians appointed to the Department are undertaking the following programme:—

1. Compilation of diet scales and daily dietaries of institutions under the control of the Department in terms of adequate protein, fat, carbohydrate, vitamin, mineral and total calorie requirements. Revision and reconstruction of existing scales, where necessary.
2. Supervision and reorganisation, where necessary, of all dietary departments or institutions under the control of the Department.
3. Inspection of State and State-aided institutions, for the purpose of giving advice and guidance in matters relating to dietetics and food administration.
4. Giving advice on matters relating to nutrition and dietetics to all Union Government and Provincial Departments, Municipal and other local authorities, public and private bodies and individuals.
5. Health education work through the press and through departmental publications, correspondence, lectures and demonstrations.

The dietitians of the Department have organised the dietary section of the King George V Jubilee Hospital for Tuberculosis in Natal. The assistant dietitian is temporarily in charge of the nurses' home kitchen and the hospital kitchen. The dietary department of this institution is contributing much of practical value in solving problems which are common to all institutions. Cooks and kitchen staff are being trained to work according to definite work schedules, to employ correct methods in using and caring for modern equipment and to understand elementary scientific principles in the preparation and service of food, so that maximum food values may be retained and unnecessary wastage eliminated. A study is being made of *per capita* cost for the different groups of patients—European, Asiatic and Coloured as well as for the staff. Daily dietaries and standardised recipes for large quantity cookery are being compiled; this, it is hoped, will later be available to all institutions requiring them, provided that the recipes have been tested sufficiently and have proved to be satisfactory in every respect. Records are being made of foodstuffs "as purchased" in relation to "edible portion" and size of average servings. This last study will be invaluable in gauging the adequacy of diet scales for any group of persons. Temperature control methods and duration of cooking periods for different foodstuffs are also being tested and recorded.

It is hoped to train more Home Economics graduates at this institution, so that they may be drafted where necessary to other institutions under the control of the Department.

Valuable services are now being provided to other Government Departments responsible for institutions of various kinds. The Departmental dietitians are to undertake inspecting and advisory work for the vocational, commercial, industrial and reformatory schools of the Union Department of Education; for the hostels and other institutions of the Department of Social Welfare, for the hostels, hospitals, and other institutions of the Provincial Administrations, and the Departments of the Interior and of Defence.

At the request of the South African National Council for Child Welfare, the Social Services of South Africa and the Social Welfare Department, a minimum diet scale has been drawn up for adults and children at different age levels. The scale includes a table of substitutes for the basic foods, their deficiencies and the supplements required to compensate such deficiencies. Adequate allowances are made for total calories, protein, fat, vitamin and mineral requirements, and are in keeping with the standards laid down by Sherman and the Technical Commission of the Health Committee of the League of Nations.

A scale similar to the above, but incorporating some of the Native foods, has been drawn up for use by certain organisations using Native labour. Diet scales for the staff, students and employees of the Girls' Training Centre, Pretoria, have been submitted to the Committee and are now in use at this institution. Daily dietaries covering a period of twelve weeks have been compiled for the Director of the Pre-school Teachers' Training Centre, Lady Buxton Home, Claremont, and the South African National Council for Child Welfare for use in nursery schools. These dietaries have also been issued to teachers and parents of pre-school children. The pamphlet "Food and Health" issued by the Department has been completely revised and has been adjusted to include some of the newer aspects of nutrition. Other pamphlets dealing with the subject of nutrition have been issued. These are:—(1) Factors Influencing Nutrition and the Prevention of Malnutrition in Children, (2) Foods for the Pre-school Child, (3) Meals for the Pre-school Child. In addition, an article entitled "The Hospital Dietitian" has been prepared by the Senior Dietitian for publication in the *South African Medical Journal*.

45.—HEALTH EDUCATION.

The National Health Education Committee has come into being as a result of the arrangements outlined in last year's report. Based on the South African Red Cross Society organisation the Committee has been constituted of representatives of all groups concerned or interested in the work of health education and propaganda. This constitution has fully justified itself by enrolling in the campaign all the most valuable workers and experts in this field. The Committee includes for example medical officers of health, sociologists, educationalists, and experts in first-aid, Native welfare, industrial hygiene and rural welfare. The Department maintains full control by its multiple representation and by close scrutiny of all material produced and issued by the Committee.

In so far as work of the Committee is concerned the past year has been one largely of preparatory organisation. This has been successfully accomplished so that mass production of most valuable and instructive material only awaits the full financial assistance of the Government. A brief summary of the achievements of the last year may be given:—

Charts.—Five school charts with keys have been distributed free to all schools in the Union. This service has met with unusual appreciation.

Health Posters.—Five health posters have been prepared and the first two on tuberculosis and venereal diseases are in course of distribution.

Lecture Notes.—Twenty sets of notes on general health subjects for use by school teachers are being issued to all branches. Another set of fifteen subjects on child guidance and elementary facts of social hygiene has also been prepared.

Health Lectures.—Subjects and lectures have been arranged for local authorities and organisations throughout the country.

Health Weeks and Exhibits.—Material, lecturers and assistance of all kinds have been provided for local authorities and organisations in different parts of the country.

Press Publicity.—Health articles of a reliable kind have been made available to the press.

Health Films.—The Committee has met the need for health films of a South African colour and is producing two at present.

It will be seen that all aspects of health education are being met.

A list of the cinema films owned by the Department which are available to local authorities and public bodies for exhibition purposes is given hereunder. Synopses of the individual films are available on application. It is recommended that those who are organising health weeks, classes of instruction and similar health work should write in good time to the Department stating the particular subjects and type of audience which they have in view, so that a suitable selection of films may be made. The Film Division, Department of Education, has responded to a request from the Department to include health subjects in its library, and a large series is now available for the members of the Bureau. Health officers and others interested in health education should approach and co-operate with headmasters of schools who are members of the Bureau, with a view to increasing the effective range of their efforts.

LIST OF CINEMA FILMS OWNED BY THE DEPARTMENT.

DIPHTHERIA.

Diphtheria, 16 mm. (Silent).

How to Prevent Disease (in Science of Life Series), 16 mm. (Silent).

EDUCATIONAL. (Suitable for Schools and Evening Classes.)

The Science of Life Series (12 reels); 16 mm. (Silent):—

1. How Disease is Spread.
2. How to Prevent Disease.
3. How Plants and Animals cause Disease.
4. Interdependence of Living Things.
5. Reproduction in Higher Forms of Life.
6. Reproduction in Lower Forms of Life.
7. The Beginning of Life.
8. How the Mosquito Spreads Disease.
9. The Fly as a Disease Carrier.
10. Personal Hygiene for Young Women.
11. Personal Hygiene for Young Men.
12. General Personal Hygiene.

The Gift of Life (4 reels), 16 mm. (Silent).

Science of Modern Medicine (3 reels), 16 mm. (Silent).

Body Defences against Disease, 16 mm. (Sound).

The Human Body (8 reels), 16 mm. (Silent):—

- The Heart.
- The Blood Vessels.
- The Respiratory System.
- The Digestive Tract (2 reels).
- The Urinary System.
- Human Development (2 reels).

GENERAL SANITATION.

- The Fly Danger, 16 mm. (Silent).
- Camp Sanitation, 16 mm. (Silent).
- The House Fly, 16 mm. (Sound).
- Serving the Community, 16 mm. (Silent).
- Sewage Disposal, 16 mm. (Silent).
- Preventing the Spread of Disease, 16 mm. (Silent).
- The Red Army (Bug Destruction), 16 mm. (Sound).
- Giro the Germ (2 reels), 35 mm. (Silent).
- Giro and his Enemies, 16 mm. (Silent).
- London Water Board, 35 mm. (Silent).
- Ground Water, 16 mm. (Sound).
- The Filter, 16 mm. (Sound).

HOME NURSING.

- Home Nursing: Routine Procedures, 16 mm. (Silent).
- Home Nursing: Special Procedures, 16 mm. (Silent).
- Home Nursing: The Bed Bath, 16 mm. (Silent).

MALARIA.

How the Mosquito spreads Disease (in Science of Life Series), 16 mm. (Silent).

MATERNITY AND CHILD WELFARE.

- The Care of the Expectant Mother, 16 mm. (Silent).
- Normal Breast Feeding, 16 mm. (Silent).
- Breast Feeding (Difficult Cases), 16 mm. (Silent).
- Your Baby, 16 mm. (Silent).
- Around the Clock with You and Your Baby (3 reels), 16 mm. (Silent).
- Infant Management (2 reels), 16 mm. (Silent).
- Judy's Diary (2 reels), 16 mm. (Silent).
- Baby's Bath and Toilet, 35 mm. (Silent).

NUTRITION.

Milk—The Master Builder, 35 and 16 mm. (Silent).
 Milk (2 reels), 35 mm. (Sound).
 The Long Haul *versus* the Short Haul (Dirty Milk), 35 mm. (Silent).
 Drinking Health (Pure Water) (2 reels), 35 mm. (Silent).
 The Alimentary Tract, 16 mm. (Sound).
 Digestion, 16 mm. (Silent).
 Digestion of Food, 16 mm. (Sound).
 Food and Growth, 16 mm. (Silent).
 Good Foods: A Drink of Water, 16 mm. (Silent).
 Good Foods: Bread and Cereals, 16 mm. (Silent).
 The Well Balanced Diet, 16 mm. (Silent).
 Enough to Eat, 16 mm. (Sound).

PERSONAL HYGIENE AND PHYSICAL EDUCATION.

Forming the Habits of Health, 35 mm. (Silent).
 The Priceless Gift of Health, 35 mm. (Silent).
 If it's Health You're Seeking, 16 mm. (Silent).
 How to Live Long and Well, 16 mm. (Silent).
 Why Willie was Willing to Wash, 35 mm. (Silent).
 Cleanliness: Clean Clothes, 16 mm. (Silent).
 Cleanliness: Clean Face and Hands, 16 mm. (Silent).
 Confessions of a Cold, 35 and 16 mm. (Silent).
 The Mechanism of Breathing, 16 mm. (Sound).
 Your Mouth, 35 mm. (Silent).
 Tommy Tucker's Tooth, 35 mm. (Silent).
 Care of the Teeth, 16 mm. (Silent).
 X-ray on Teeth, 16 mm. (Silent).
 Vision, 16 mm. (Sound).
 The Feet, 16 mm. (Silent).
 Posture (2 reels), 16 mm. (Silent).
 Carriage (Physical Training), 16 mm. (Sound).
 Analysis of Agility Exercise, 16 mm. (Sound).
 Physical Education: Infants, 16 mm. (Sound).
 Physical Training: Boys, 16 mm. (Sound).
 Physical Training: Girls (2 reels), 16 mm. (Sound).

TUBERCULOSIS.

The Story of Papworth (2 reels), 35 mm. (Sound).
 Tuberculosis and How it may be Avoided, 16 mm. (Silent).
 Jinks, 35 and 16 mm. (Silent).

VENEREAL DISEASE.

John Smith & Son—(Gonorrhoea) (3 reels), 16 mm. (Silent).
 Trial for Marriage (3 reels), 16 mm. (Sound).
 Venereal Disease (3 reels), 16 mm. (Silent).
 Test for Love (3 reels), 16 mm. (Sound).
 Let's Open our Eyes, 16 mm. (Sound).

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The Departmental pamphlets continue to be in demand. The series obtainable is:—

- "Senecio Disease." (Warning Notice.) No. 166 (Health).
- "Food and Health." No. 194 (Health).
- "Anthrax." No. 239 (Health).
- "Venereal Diseases: Their Prevention and Treatment." No. 248 (Health).
- "Instructions to Persons suffering from Gonorrhoea." No. 249 (Health).
- "Instructions to Persons suffering from Syphilis." No. 250 (Health).
- "Instructions to Native Patients suffering from Syphilis or Gonorrhoea." (In Zulu, Sixosa, Sesutu, and Sechuana.) No. 358 (Health).
- "Poisoning by 'Stinkblaar' or Thorn Apple (*Datura stramonium* and *Datura tatula*)." Warning Notice. No. 256 (Health).
- "Smallpox: Duties and Powers of Local Authorities under Public Health Act, and procedure to be followed in dealing with outbreaks." No. 276 (Health).
- "Directions for the Performance of Public Vaccination." No. 279 (Health).
- "Dagga Smoking and its Evils." No. 289 (Health).
- "Plague: Its Control, Eradication and Prevention." No. 316 (Health).
- "Plague Prevention and Rodent Destruction." No. 317 (Health).
- "Rodents: Description, Habits, and Methods of Destruction." (W. Powell.) No. 321 (Health).
- "Houseflies: Their Life-history, Destruction and Prevention, and their Influence on Health." No. 335 (Health).
- "Bilharzia (Human Redwater) Disease." No. 339 (Health).
- "Snake-bite and its Treatment." No. 348 (Health).
- "Influenza." No. 363 (Health).
- "Typhoid or Enteric Fever: Its Causes, Spread and Prevention in South Africa." No. 365 (Health).
- "Catechism about Typhoid or Enteric Fever." No. 378 (Health).
- "Care of the Teeth and Prevention of Dental Disease in Children." No. 368 (Health).
- "The Teeth: How to Prevent Decay." No. 379 (Health).
- "Typhus or Louse Fever." No. 417 (Health).
- "Typhus Catechism." (In Zulu, Sixosa, Sesuto, and Sechuana.) No. 488 (Health).
- "Consumption, its Causes, Prevention and Treatment." No. 439 (Health).
- "Malaria Catechism for use in Schools." No. 360 (Health).
- "Truths about Cancer." (Published jointly with the National Cancer Association of South Africa.) No. 473 (Health).
- "Rabies." (Published jointly with the Director of Veterinary Services, Department of Agriculture and Forestry.) No. 501 (Health).
- "Motherhood." No. 482 (Health).

Malaria Pamphlet No. 1: "Malaria Control with the description of the Life-history of the Malaria Parasite and the Habits of the Mosquito Vector." No. 527 (Health).

Malaria Pamphlet No. 2: "Directions for the Prevention and Treatment of Malaria and Blackwater Fever." No. 198 (Health).

"Pail Latrines." No. 580 (Health) and 586 (Health).

"Pit Privies." No. 585 (Health).

46.—PHYSICAL EDUCATION.

The national scheme for promoting physical fitness has been further developed. A sum of £50,000 was set aside for the financial year 1938-39 to be allocated as follows:—

- (a) Expenditure through the Department of Defence, in co-operation with the South African Railways and Harbours Administration £25,000
- (b) In aid of the work at educational institutions such as universities, colleges, primary, secondary and vocational schools, to be spent through the education departments £15,000
- (c) Expenditure through local authorities and voluntary organisations £10,000

The money allocated to the Departments of Defence and Railways is providing for physical training to the Permanent Force, Special Service Brigades, Active Citizen Units, School Cadet Corps, Defence Rifle Associations, Red Cross and St. John Ambulance Units.

The remaining £25,000 was disposed of on the advice of the National Advisory Council for Physical Education. This body consists of the following members:—

1. The Secretary for Education (Prof. M. C. Botha)—Chairman.
2. The Secretary for Public Health (Dr. E. H. Cluver).
3. The Secretary for Defence (Mr. A. H. Broeksma).
4. The Secretary for Social Welfare (Mr. G. A. C. Kuschke).
5. The Superintendent of Education, Natal (Mr. F. D. Hugo), representing the Natal Provincial Administration.
6. The Superintendent-General of Education, Cape (Dr. W. de Vos Malan), representing the Cape Provincial Administration.
7. The Director of Education, Transvaal (Mr. H. H. G. Kreft), representing the Transvaal Provincial Administration.
8. The Director of Education, Orange Free State (Mr. S. H. Pellissier), representing the Orange Free State Provincial Administration.
9. Major Troskie Maré, D.S.O., M.P.C., representing the United Municipal Executive of South Africa.
10. Mr. R. Honey, representing the S.A. Olympic and British Empire Games Association.
11. A woman teacher of physical education (Miss E. Percival Hart).
12. An expert on physical education.

Various methods for making propaganda have been introduced by the National Council. It was felt that perhaps the most effective would be to invite the world-renowned expert in the field of physical education, Mr. Niels Bukh, to tour the Union with a team of Danish gymnasts. It was accordingly arranged for Mr. Bukh to spend the period 24th August to 13th October, 1939, in this country. Mr. Bukh has in his Danish school developed and modernised the system of gymnastics devised a century ago in Sweden by Ling. This system appeals particularly to authorities concerned with the promotion of public health as it is based on sound principles of anatomy and physiology. These exercises can without much expenditure of money be made easily available to all sections of the community. They are pleasureable and much more likely to be persisted in than most other systems.

47.—THE VOORTREKKER CENTENARY CELEBRATIONS AT PRETORIA.

These celebrations culminated in a four days camp and the actual laying of the foundation stone at Pretoria on December 16th, 1938. Immense crowds were attracted to these events. Such enthusiasm not having been anticipated, emergency arrangements had to be undertaken to meet the health and medical needs of the great gathering.

Dr. H. S. Gear of this Department was seconded to undertake the general supervision of these arrangements. The actual provision of services was secured by calling up various organisations. The general sanitary arrangements and the water supply were undertaken most efficiently by the Pretoria City Council. Water was pumped by two units operating day and

night from the Fountains Valley source up to the Roberts Heights reservoir, from which a pipe line was laid to a new 100,000 gallons reservoir built of brick immediately below the monument site. This in turn through a complete reticulation pipe system supplied the various water lines of the camp. Several blocks of simple showers enclosed in triple hessian screens placed on tarmac bases were erected at convenient points.

The proximity of the Fountains area and the unsuitability of the soil eliminated the possibility of using the pit system for latrines. Blocks of pail latrines had therefore to be used. By an ingenious system of continuous removals by vacuum tanks and strict supervision the latrine accommodation met all requirements. The City Council maintained a camp staff of European inspectors and Native assistants which ensured the cleanliness and freedom from nuisance of the camp throughout.

The first-aid and medical arrangements were successfully met by the three voluntary associations—the South African Red Cross Society, St. John Ambulance Association and the Nood Hulp Liga, and by a team of doctors recruited in Pretoria. Simple first-aid stations were erected and a central headquarters station was also equipped as a clearing station for hospital cases. This first-aid organisation treated approximately 4,000 patients, the vast majority of whom suffered from minor complaints.

The ambulance services were compounded from units supplied by the Pretoria City Council, the Controller of Transport and the Defence Department. The Pretoria Hospital Board agreed to special temporary accommodation being erected at the General Hospital which enabled Dr. H. J. Hugo, the Superintendent, to make available 120 beds for Voortrekker patients. A further temporary hospital provided another 60 beds. However, only 56 hospital patients were treated.

From the health and medical point of view the celebrations passed off uneventfully. Their interest lies in the administrative problem created by sanitary, medical and hospital facilities being required for unprecedented crowds at short notice. If these had failed there would have arisen not merely immediate disaster, but the possibility of disease being broadcast by the dispersing crowds.

48.—PUBLICATIONS.

DR. E. H. CLIVER:

- "Health: Demand and Supply." Report to the Carnegie Visitors Grant Committee on Public Health Organisation in the United States of America. Four papers published in *The Forum*, 19th September, 26th September, 3rd October, 10th October, 1938.
- "Nutrition of the Union Population." *Journal of the Royal Sanitary Institute*, Vol. LIX, No. 2, August, 1938.
- "The Nutrition Problem in South Africa." (Paper read at the South African Medical Congress, September, 1938.) *S.A. Medical Journal*, Vol. XIII, No. 3, 11th February, 1939.
- "Physical Culture and Public Health." *Physical Education*, Vol. I, No. 1, April, 1939.
- "National Health Insurance." (Paper read at the meeting of the Cape Western Branch of the Medical Association of South Africa, 28th April, 1939.) *S.A. Medical Journal*, Vol. VIII, No. 10, 29th May, 1939.
- "Public Health in South Africa." Second Edition. Text Book. Published by the Central News Agency, Johannesburg, 1939.

DR. PETER ALLAN:

- "The Treatment of Pulmonary Tuberculosis from the Public Health Aspect." *S.A. Medical Journal*, Vol. XIII, May 13th, 1939.
- "Enteric." Paper read before Health Officials Association on 26th April, 1939.
- "Public Health" (in the press).

DR. F. W. P. CLIVER:

- "Malaria Control in Natal and Zululand." Paper read at South African Medical Congress, Port Elizabeth, June, 1939.

DR. H. SUTHERLAND GEAR:

- "Some Notes on the Medical and Health Aspects of the Voortrekker Centenary Celebrations at Pretoria." *S.A. Medical Journal*, Vol. XIII, 1939, page 156.
- "Nutrition Survey: Interim Report." Department of Public Health, April, 1939.

DR. D. H. S. ANNECKE:

- "Treatment of Malaria in the Transvaal." *S.A. Medical Journal*, Vol. XII, 1938, page 905.

DR. G. W. GALE:

- "The Incidence and Control of Venereal Diseases among the Natives of an Urban Area." *S.A. Medical Journal*, Vol. XIII, 1939, page 265.

DR. B. F. SAMPSON:

- "Epidemic of Peripheral Neuritis of Unusual Origin." *Office International d'Hygiene publique. Bull.* 1938.

DR. N. L. MURRAY :

- " Smallpox of Yesterday and To-day in South Africa." *" The Leech "*, June, 1938, pages 12-17.
- " Six Common Venereal Diseases, Can you Recognise Them? " *" The Leech "*, 1938.
- " The Causal Organism of South African ' Sandworm ' Eruption." *British Medical Journal*, 20th May, 1939, pages 1026-1027.

DR. M. H. FINLAYSON :

- " A Provisional Stable Standard for Cobra Antivenene and its Practical Applications " (with Mr. J. M. Grobler). *S.A. Medical Journal*, 1939, January 14th.
- " The Stability of Tincture of Digitalis B.P. in South Africa " (with Dr. H. A. Shapiro). *S.A. Pharmaceutical Journal*, 1938, October.
- " Pharmacological Actions of the Venom of *L. indistinctus* " (with Drs. H. A. Shapiro and N. Sapeika). *S.A. Journal of Medical Sciences*, 1939, IV, 10.

DR. H. A. SHAPIRO :

- " The Action of Mixtures of Quinine and Pituitary (Posterior Lobe) Extract on the Uterus of the Virgin Guinea-pig." *S.A. Journal of Medical Sciences*, 1939, IV., Supp. 9.
- " The Histological Changes in the Accessory Sex Organs of Female *Xenopus* induced by the Administration of Endocrine Preparations " (with Mr. L. Berk). *South African Journal of Medical Sciences*, 1939, IV., Supp. 13.
- " Ovulation in *Xenopus Laevis* induced by certain Steroids." *S.A. Journal of Medical Sciences*, 1939, IV., Supp. 21.
- " Pharmacological Actions of the Venom of *Latrodectus Indistinctus* " (with Dr. N. Sapeika and Dr. M. H. Finlayson). *S.A. Journal of Medical Sciences*, 1939, IV., 10.
- " The Stability of Tincture of Digitalis B.P. in South Africa " (with Dr. M. H. Finlayson). *S.A. Pharmaceutical Journal*, 1938.

DR. T. OCKERSE :

- " A Comparison of the Diets of the Children, Soils and Waters in the Kruisrivier, Beaufort West and Alldays Areas in relation to Dental Caries." *S.A. Dental Journal*, Vol. XIII, No. 4, pages 108-113 (1939).
- " Dental Services in South Africa." *S.A. Dental Journal*, Vol. XIII, No. 4, pages 114-124 (1939).

MR. D. H. S. DAVIS :

- " An Attempt to Determine the Absolute Number of Rats on a Given Area " (with Leslie, P. H.). *Journal of Animal Ecology*, 8: 94-113.
- " On some Ecological Methods in Research on Bubonic Plague." *S.A. Journal of Science*, 1939 (in press).
- " Quantitative Methods in the Observation of Big Game in the Kruger National Park." *S.A. Journal of Science*, 1939 (in press).

MISS GRACE SEDGWICK :

- " The Canning of Vegetables, Meats and Fish in the Steam Pressure Cooker." *Farming in South Africa*, 1938, October.
- " Home Economics as an Education for Life." *Farming in South Africa*, 1939, February.

Officers of the Department continued during the year to participate in numerous conferences and discussions and to contribute articles and addresses to non-technical journals. Especially important have been articles prepared by the Department for distribution through the Native press.

	PRICE (Post Free within the Union). s. d.	
Office Administration and Shipping Combination Encouragement Act No. 10, 1911, as Amended to 1923	1	0
Health Act No. 36, 1919, as Amended to 1933	2	0
Prevention of Cruelty to Animals Act No. 8, 1914, as Amended to 1933	1	0
Act No. 26, 1920, with Regulations thereunder regarding the	0	3
Goods between the Union and Rhodesia— Regulations regarding the	0	3
Act No. 13, 1920, as Amended to 1933	1	0
Assemblies Act No. 27, 1914, as Amended to 1933	0	6
Act, 1910, with Amending Acts to 1933	3	0
Benefit Act, 1937, and Regulations	2	6
Act, 1937, and Regulations	1	6
Compensation Regulations, 1935	1	6
Measures Act No. 32, 1922, as Amended to Act No. 13, 1933, with Proclamations in force at 30th December, 1933, together with the Measures Regulations, 1933	2	0

MISCELLANEOUS PUBLICATIONS.

Administration of Trade and Shipping of the Union of South Africa and the Territory of South West Africa, 1908	42	0
Memor No. 15—A Vegetation Map of South Africa. By I. B. Pole-Evans, C.M.G., M.A., F.R.S., F.L.S.	2	6
Memoirs:		
Contributions towards Venda History, Religion and Tribal Ritual. By N. J. v. Warmelo. (Volume III)	7	6
History of Matiwane and the Amangwane Tribe. (Volume VII)	7	6
Terminology of the South African Bantu. By N. J. v. Warmelo. (Volume II)	5	0
Customs in Southern Natal. By Dr. W. Gubbins, M.D. (Volume IV)	5	0
Survey of the Bantu Tribes of South Africa. By N. J. v. Warmelo. (Volume V)	20	0
Ndebele Texts. By N. J. v. Warmelo. (Volume I)	5	0
English Dictionary (Volume VI)	5	0
Anatomy and Physiology First Aid, Hygiene. A Preliminary Handbook for Nurses	5	0
Dumping Duties	0	6
Handbook for	5	0
Development in South Africa	1	0
Book No. 19, 1938	5	0
Brought. By Reenen J. van Reenen	2	0

PUBLICATIONS OF GEOLOGICAL SURVEYS.

GEOLOGICAL COMMISSION OF THE CAPE OF GOOD HOPE.		
Reports:		
Annual Report, 1910	2	6
Maps of the Colony of the Cape of Good Hope:		
Sheets were published in colour on the scale of 1:258,000 or 3.8 miles to the inch. Price		
Robertson, 33. Britstown, 1909. (Out of print.)		
Edmond - Rivers- 40. Marydale, 1910.		
1907. 41. Griquatown, 1909.		
Ceres, 42. Kimberley, 1908. (Out of print.)		
1907. (Out of print.) 45. Postmasburg (Griqua- land West), 1907.		
1911. 46. Barkly West, 1908.		
West- 49. Kuruman, 1908.		
1911. 50. Vryburg, 1908.		
1912. 52. Mafeking, 1908.		
1912. 52. Mafeking, 1908.		
Vlei, 1910.		

THE GEOLOGICAL SURVEY OF NATAL AND ZULULAND.		
Report, 1904	7	0
Final Report, 1907	7	0

THE GEOLOGICAL SURVEY OF THE TRANSVAAL.

Reports:		
Report for 1909—109 pages and 14 plates (including 6 maps). Deals with portions of Tzaneen, Rustenburg, Middelburg, Lydenburg, and Marico Districts, also the Klip River Valley	7	6
—The Geology of the Pilgrims Rest Gold District. By A. L. Hall. 158 pages, and 1 map. 1910	7	6
Map of the Transvaal:		
—Mafeking. (Explanations by A. L. Hall and W. A. Humphrey.) 1910	5	0
Publications:		
Report on a Reconnaissance of the North-West District. By T. G. Trevor and J. F. Mellor. 40 pages, 16 plates, and 1 map. 1910	2	6

PRICE
 (Post Free
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 s. d.

THE GEOLOGICAL SURVEY OF THE UNION OF SOUTH AFRICA.	
(a) <i>Annual Reports</i> (discontinued after 1913):	
Annual Report for 1911. 114 pages and 14 plates (including 3 maps). Deals with Central Wit- watersrand, portions of Rustenburg District (including the Pilansberg), Vryheid District, and Zululand. Also a Report on the Coal Resources of South Africa	7 0
Annual Report for 1913. 116 pages and 9 plates (including 4 maps). Deals with portions of Barberton, Carolina, Piet Retief, and Wakker- stroom Districts, Transvaal; Ngotshe Division and Alfred County, Natal; Namaqualand and East Griqualand, Cape Province	7 6
(b) <i>Memoirs</i> :	
No. 8.—Report on the Prospect of finding Oil in the Southern Karroo. By A. W. Rogers. 8 pages and 1 map. 1917	0 6
No. 9.—The Geology of the Barberton Gold Mining District. By A. L. Hall. 347 pages, 58 plates, and 1 map. 1918	7 6
No. 10.—Report on the Phosphates of Saldanha Bay. By A. L. du Toit. 38 pages and 2 maps. 1917	2 6
No. 11.—The Limestone Resources of the Union:	
Vol. I.—The Limestones of the Transvaal and Portions of Bechuanaland and Zulu- land. By W. Wybergh. With a Chapter on the Deposits of Port Shepstone and Hermansberg. By A. L. du Toit. 122 pages and 2 maps. 1918	5 0
Vol. II.—The Limestones of Natal, Cape, and Orange Free State Provinces. By W. Wybergh. 149 pages. 1920	5 0
No. 12.—Asbestos in the Union of South Africa; second edition. By A. L. Hall. 291 pages, 36 plates, and 1 map. 1930	7 6
No. 13.—Mica in the Eastern Transvaal. By A. L. Hall. 95 pages, 17 plates, and 1 map. 1920	7 6
No. 14.—The Nitrate Occurrences in the Districts of Prieska and Hay, Cape Province. By G. E. B. Frood, Inspector of Mines (Acting) and A. L. Hall. 52 pages. 1919	2 6
No. 15.—Corundum in the Northern and Eastern Transvaal. By A. L. Hall. 210 pages, 23 plates, and 1 map. 1920	7 6
No. 16.—The Mutue Fides-Stavoren Tinfields. By P. A. Wagner. 192 pages, 30 plates, and 1 map. 1921	7 6
No. 17.—Report on the Crocodile River Iron Deposits. By P. A. Wagner. 65 pages, 11 plates, and 1 map. 1921	5 0
No. 18.—A Bibliography of S.A. Geology to the end of 1920. Authors' Index. By A. L. Hall. 376 pages. 1922	10 6
No. 19.—The Coal Resources of the Union of South Africa:	
Vol. I.—The Coalfields of Witbank, Springs, and Heidelberg, and of the Orange Free State. By W. Wybergh. 134 pages, 12 plates, and 3 maps. 1922	10 0
Vol. II.—The Inland Coalfields of Natal. By W. Wybergh. 180 pages and 2 maps. 1925	10 0
Vol. III.—The Coalfields of the Eastern and South-Eastern Transvaal, Springbok Flats, Waterberg, Zoutpansberg, and of the Cape Province. By W. Wybergh. 182 pages and 6 maps. 1928	10 0
No. 20.—The Pretoria Salt-Pan: A Soda Caldera. By P. A. Wagner. 136 pages, 18 plates, and 1 map. 1922	7 6
No. 21.—On Magnetic Nickel Deposits of the Bushveld Complex in the Rustenburg District, Transvaal. By P. A. Wagner. 181 pages, 21 plates, and 1 map. 1924	7 6
No. 22.—A Subject Index to the Literature on the Geology and Mineral Resources of South Africa. (Supplement and companion volume to Memoir No. 18.) By A. L. Hall. 384 pages. 1924	10 0
No. 23.—The Economic Geology of Sabie and Pilgrims Rest. By W. J. Wybergh. 124 pages and 2 maps. 1926	5 0
No. 24.—Preliminary Report on the Platinum Deposits in the South-Eastern Part of the Rustenburg District, Transvaal. By P. A. Wagner. 42 pages and 1 map. 1926	2 6
No. 25.—A Bibliography of South African Geology for the Years 1921 to 1925 (inclusive). Authors' Index. By A. L. Hall. 117 pages. 1927	5 0
No. 26.—The Iron Deposits of the Union of South Africa. By P. A. Wagner. 263 pages, 45 plates, and 30 text figures. 1928	10 0
No. 27.—A Bibliography of South African Geology for the Years 1926 to 1930 (inclusive). Authors' Index. By A. L. Hall. 160 pages. 1931	5 0

	PRICE (Post Free within the Union). s. d.		
No. 28.—The Bushveld Igneous Complex of the Central Transvaal. By A. L. Hall. 510 pages, 40 plates, 40 text figures, and 1 map in colour. 1932	10 0	Geological Map of the Country around Ventersburg. Scale 1 : 63,360. With an Explanation by Louis T. Nel. 1927.	
No. 29.—The Building Stones of the Union of South Africa. By W. Wybergh. 238 pages, 1 plate, and 1 map. 1932	7 6	The Geology of the Postmasburg Area. Deposits. Scale 1 : 49,501. With an Explanation by Louis T. Nel. 1929	
No. 30.—A Bibliography of South African Geology for the years 1931 to 1935 (inclusive). Authors' Index. By A. L. Hall. 1937	5 0	Physical Map of the Union of South Africa and adjoining Territories, coloured to show the extent of land. Compiled by Eric H. Backus, on a scale 1 : 1,000,000; in four sheets. 1931	
No. 31.—The Pegmatite Area south of the Orange River in Namaqualand. By T. W. Gevers. 164 pages, 16 plates, 5 text figures and one map. 1937	7 6	Geological Map of Klerksdorp-Ventersburg Area. Scale 1 : 60,000. With Explanation by Louis T. Nel	
No. 32.—Analyses of Rocks, Minerals, Ores, Coal, Soils and Waters from Southern Africa. By A. L. Hall	15 0	(e) <i>Bulletins of the Mines Department, Geological Series:</i>	
No. 33.—The Geology of the Country around Bethlehem and Kestell with special reference to Oil Indications. By O. R. van Eeden. 54 pages, 4 plates, 3 text figures, and one map in colours. 1937	7 6	No. 1.—The Witwatersrand System in the Klerksdorp-Ventersburg Area. A Preliminary Outline. By Louis T. Nel. 1934	
No. 34.—The Water-bearing Properties of the More Important Geological Formations in the Union of South Africa. By H. F. Frommurge. 170 pages, 9 plates, 27 text figures	5 0	No. 2.—The Andalusite Sands of the Western Transvaal. By F. C. Partridge. 1934	
No. 35.—The Geology and Archaeology of the Vaal River Basin. By P. G. Söhne, D. J. J. Visser and C. van Riet Lowe. 134 pages, 36 plates, and 20 text figures	5 0	No. 3.—Gypsum in the Union of South Africa. 1934	
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<i>Transvaal Province.</i> Scale 1 : 148,750, or 2.35 miles to the inch.		No. 5.—The Nickel-Copper Occurrences in the Bushveld Igneous Complex, West of the Pilansberg. 1934	
No. 1.—Pretoria, Revised Edition (Explanation by L. J. Krige and B. V. Lombaard). 1929.		No. 6.—Corundum in the Union of South Africa. 1934	
No. 2.—Pienaars River, Revised Edition (Explanation by H. Kynaston). 1913.		No. 7.—Some Magnetometric and Gravity Surveys in the Transvaal. By O. W. S. Simpson, M.Sc., and G. L. Paver, B.A. 1934	
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